M SERIES
Temperature Controller

Instruction Manual

INCOE®

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1 INTRODUCTION

The M Series of temperature controllers are designed for precision control of the hot runner system at constant temperature for optimized efficiency.

M Series controllers are ideally suited for mid to high volume molding requiring 16 to 128 zones.

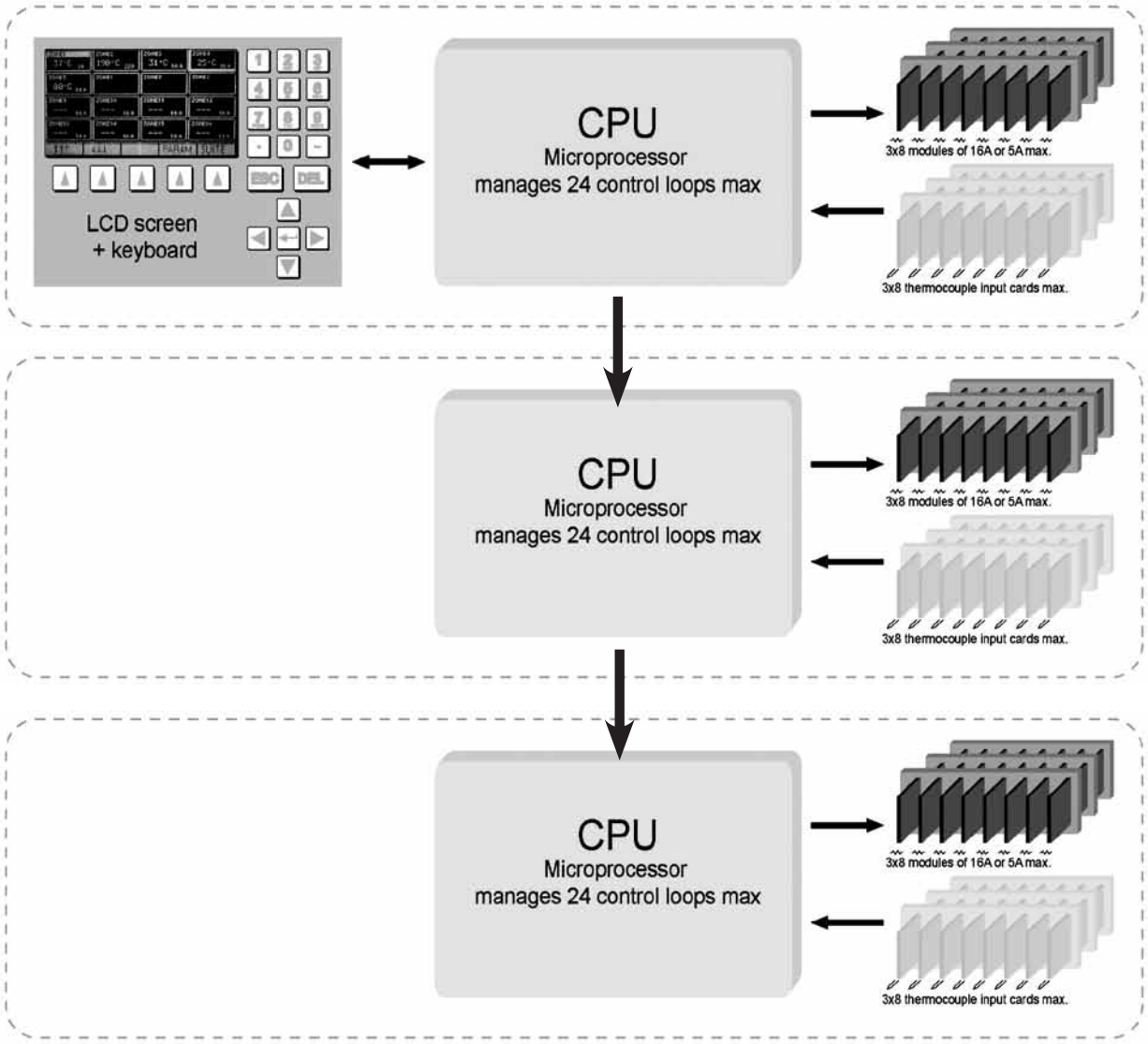
1.1 MAIN FUNCTION

This range of M Series controllers is dedicated to applications with a high number of zones to be controlled.

This new generation of hot runner control systems uses one single microprocessor for controlling up to 24 zones, making all configurations compact.

The control over 24 zones is managed by one single microprocessor communicating with modular control cards having the following function:

- Card for data acquisition from a control loop.
- Power control card 16A or 5A for a control loop.



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1.2 CABINET CONFIGURATIONS

Cabinets are submitted to EC 73/23 Directive known as "Low Voltage" and conform to EN 61010-1 Standards.

Each cabinet is equipped with a supply cable sized according to the maximum admissible current.

IMPORTANT NOTICE: If neutral is involved (Mainly for Europe market), during softstart the current value on neutral may exceed current value on one of the three phases.

This overcurrent is controlled by the main circuit breaker on backside of the cabinet.

The power consumed depends on the power of the heating elements and on the number of control loops.

Dimensions of 4U cabinet:
Height: 8.50" (216mm)
Width: 21 " (534mm)
Depth: 18.50" (470mm)

Weight of 4U cabinet:
Empty: 16.9 Lbs (7,7 Kg) or with 16 power control cards 16A: 52.6 Lbs (25,3 Kg)

Dimensions of 9U cabinet:
Height: 17.16" (436mm)
Width: 21 " (534mm)
Depth: 18.50" (470mm)

Weight of 9U cabinet:
Empty: 28.4 Lbs (12,9 Kg) or with 32 power control cards 16A: 105.8 Lbs (48,1 Kg)

A sticker is affixed on backside of cabinet showing:

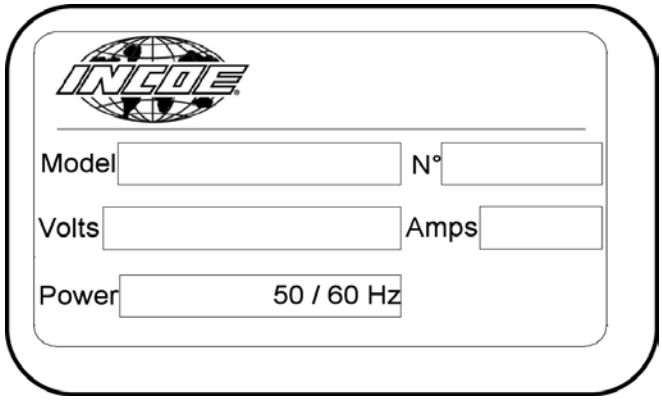
• **Serial number:** to identify when the cabinet was built (eg: 01220B stands for 20th December 2000, B is an index).

• **Type:** cabinet designation (M4U-16.00: 16 zones 16A).

• **Frequency :** all cabinets are designed for use either in 50 or 60 Hz.

• **Voltage** in three phases either in 230V or 400V with Neutral.

• **Maximum allowable current:** depends on diameter and length of supply cable.



Other stickers show:

- Wiring diagram of thermocouples.

- Wiring diagram of heating elements.

It is required to conform with wiring information.

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1.3 POWER OUTPUT

230V 3 Phases 60 Hz or 400V 3 Phases + Neutral 50 Hz when required.

The choice is made when ordering the cabinet **(see below)**.

1.4 TOLERANCES ON SUPPLY VOLTAGE

207V to 253V, or 360V to 440V when applied.

1.5 MAXIMUM CONSUMED POWER PER CABINET CONFIGURATION

Cabinet M4U-16.00: 16 x 3600W = 57600W.

Cabinet M4U-08.08: 8 x 3600W + 8 x 1000W = 36800W.

Cabinet M4U-00.16: 16 x 1000W = 16000W.

Cabinet M4U-00.24: 24 x 1000W = 24000W.

Cabinet M9U-00.32: 32 x 1000W = 32000W.

Cabinet M9U-00.48: 48 x 1000W = 48000W.

Cabinet M9U-24.00: 24 x 3600W = 86400W.

Cabinet M9U-32.00: 32 x 3600W = 115200W.

Cabinet M9U-08.16: 8 x 3600W + 16 x 1000W = 44800W.

Cabinet M9U-08.24: 8 x 3600W + 24 x 1000W = 52800W.

Cabinet M9U-08.32: 8 x 3600W + 32 x 1000W = 60800W.

1.6 MAXIMUM ADMISSIBLE CURRENT PER CABINET CONFIGURATION

Cabinet M4U-16.00: 63A

Cabinet M4U-08.08: 63A

Cabinet M4U-00.16: 40A

Cabinet M4U-00.24: 40A

Cabinet M9U-00.32: 40A

Cabinet M9U-00.48: 40A

Cabinet M9U-24.00: 100A

Cabinet M9U-32.00: 125A

Cabinet M9U-08.16: 63A

Cabinet M9U-08.24: 63A

Cabinet M9U-08.32: 63A

1.7 CABINET CLASS

Classe III according to EN 61010-1 standards.

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1.8 MAIN FEATURES OF POWER CONTROL CARDS

Power control cards are submitted to the EC 73/23 Directive known as "Low Voltage" and conform to EN 61010-1 standards.

Depending on cabinet configuration, two types of power control cards that can be integrated in M Series cabinets: 16A power control card (3600W) and 5A power control card (1000W).

Dimensions of 16A power control card:

Length: 3.74" (95 mm)

Width: 2.16" (55 mm)

Weight of 16A power control card: < 0.1 lbs (64 g)

1.9 PLANT POWER SUPPLY
230V single phase.

1.10 TOLERANCES ON POWER SUPPLY
207V to 253V

1.11 MAXIMUM CONSUMED POWER

For 16A power control card: 3600W.
For 5A power control card: 1000W.

1.12 FREQUENCY
50Hz to 60Hz.

1.13 MAIN FEATURES ON THERMOCOUPLE INPUT CARDS

Cards for thermocouples are submitted to the EC 73/23 Directive known as "Low Voltage" and conform to EN 61010-1 standards.

Dimensions of thermocouple input card:

Length: 80 mm
Width: 42 mm

Weight of thermocouple input card: 0,022 Kgs

1.14 POWER SUPPLY
12V DC.

1.15 CONNECTION TO PLANT POWER

Controllers should be grounded to a suitable ground. It is required to conform to wiring diagrams for preventing any serious damage caused to the cabinet.

CAUTION: (NOT REQUIRED in US) When supplied in 400V, neutral wiring is required otherwise safety function is impossible. The safety circuit on synchronization card will trip the circuit breaker.

1.16 INSTALLATION

Installation in dry industrial conditions.
Window for service temperature: from 14°F to 140°F.

Take care when unpacking / moving the controller

1.17 DEFINITION OF CEM APPLICABLE STANDARDS

Standard on emission in industrial environment:
EN 50081-2

Standard on immunity in industrial environment:
EN 50082-2

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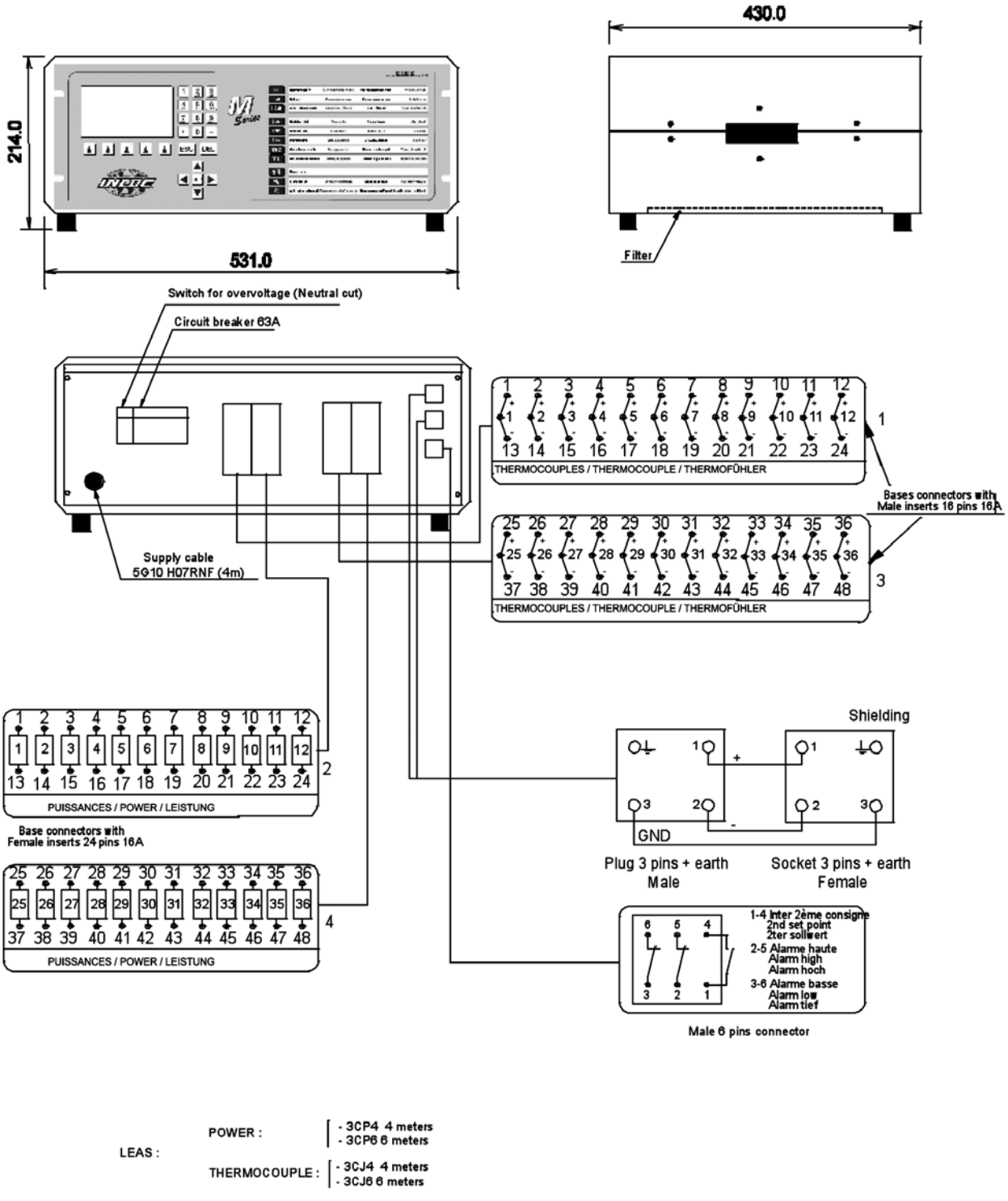
2 OPERATION

2.1 OVERALL DIAGRAM



LEAS :

POWER :
- 3CP4 4 meters
- 3CP6 6 meters

THERMOCOUPLE :
- 3CJ4 4 meters
- 3CJ6 6 meters

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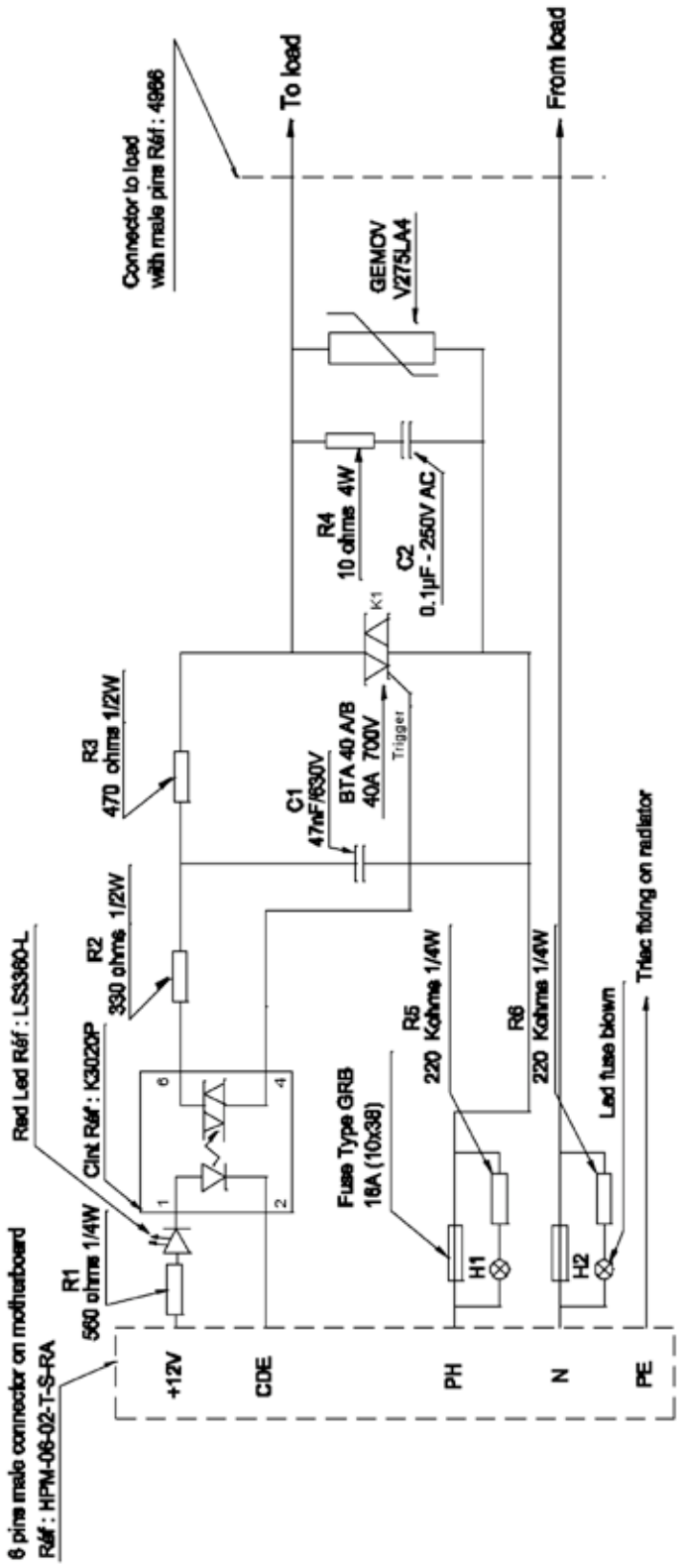
2.2 ELECTRONIC DIAGRAM OF POWER CONTROL CARD 16A



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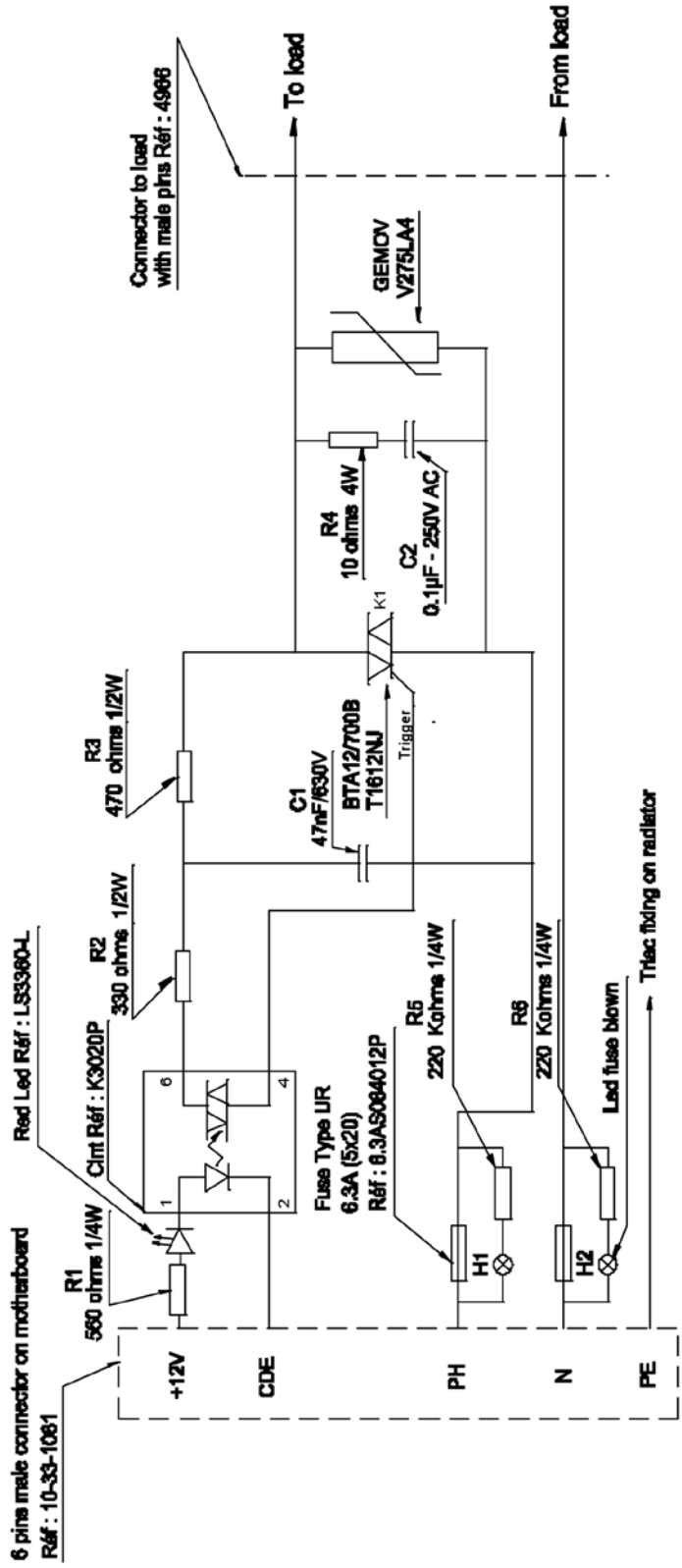
2.3 ELECTRONIC DIAGRAM OF POWER CONTROL CARD 5A



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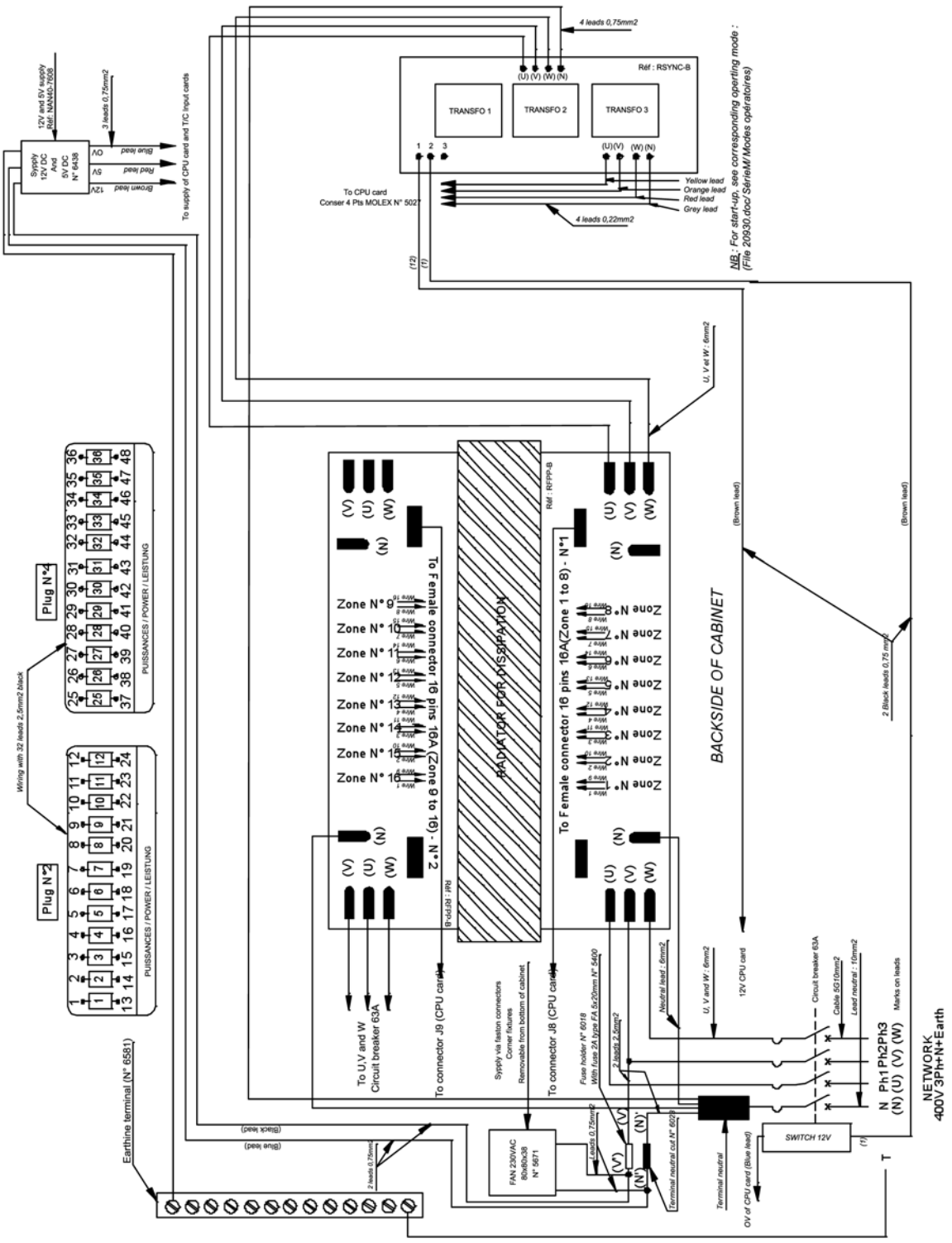
2.4 ELECTRICAL DIAGRAM FOR POWER ON CABINET M4U-16.00



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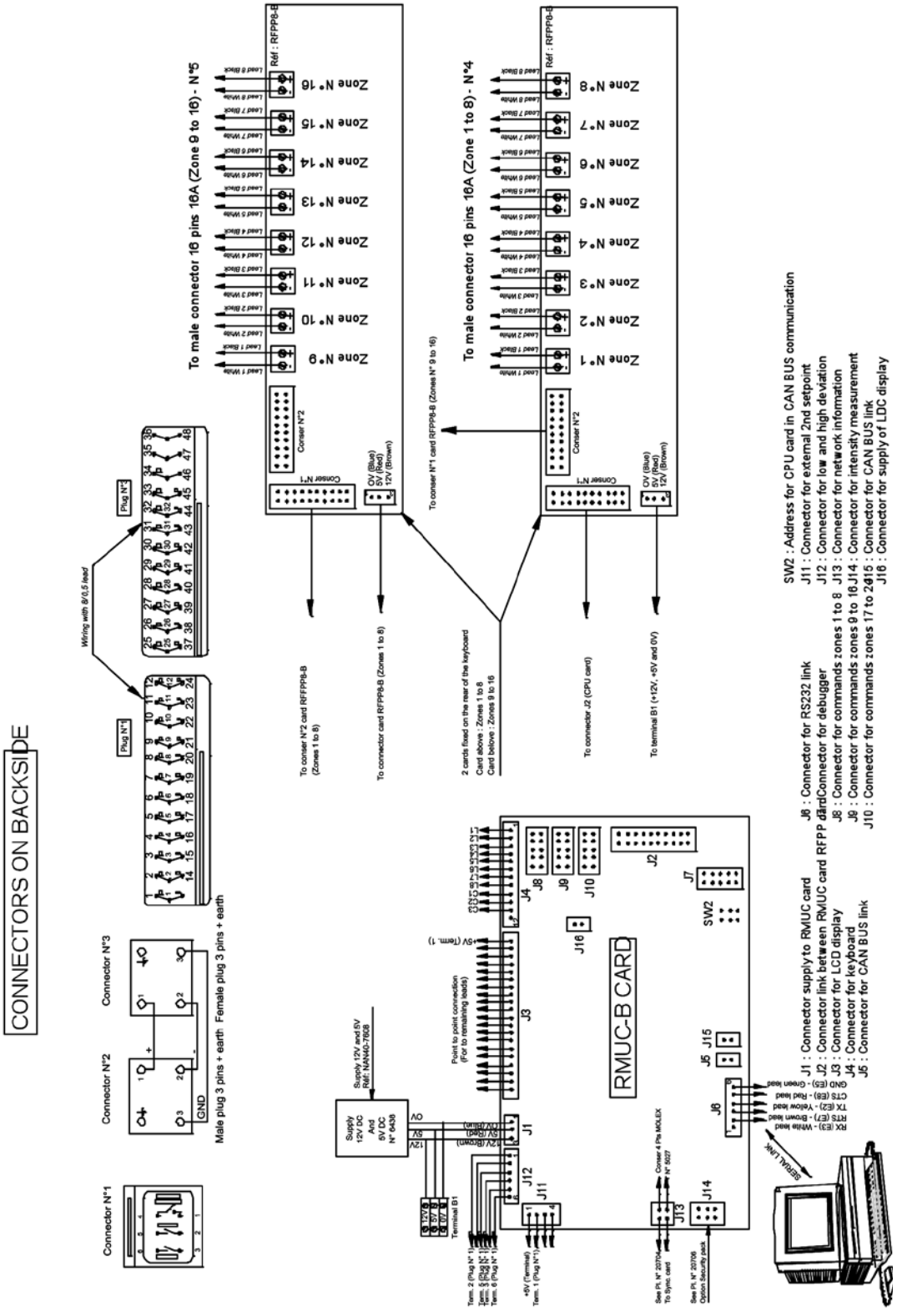
2.5 ELECTRICAL DIAGRAM FOR COMMANDS ON CABINET M4U-16.00


CONNECTORS ON BACKSIDE
Connector N°1
Connector N°2
Connector N°3
GND
Male plug 3 pins + earth Female plug 3 pins + earth
Plug N°3
Plug N°4
Wiring with 8/10,5 lead
To male connector 16 pins 16A (Zone 9 to 16) - N°5
To male connector 16 pins 16A (Zone 1 to 8) - N°4
Ref : RFPP8-B
Zone N° 16
Zone N° 15
Zone N° 14
Zone N° 13
Zone N° 12
Zone N° 11
Zone N° 10
Zone N° 9
Zone N° 8
Zone N° 7
Zone N° 6
Zone N° 5
Zone N° 4
Zone N° 3
Zone N° 2
Zone N° 1
Conser N°1
Conser N°2
0V (Blue)
5V (Red)
12V (Brown)
To conser N°1 card RFPP8-B (Zones N° 9 to 16)
To conser N°2 card RFPP8-B (Zones 1 to 8)
To connector card RFPP8-B (Zones 1 to 8)
2 cards fixed on the rear of the keyboard
Card above : Zones 1 to 8
Card below : Zones 9 to 16
To connector J2 (CPU card)
To terminal B1 (+12V, +5V and 0V)
RMUC-B CARD
Supply 12V and 5V Réf: NAN40-7808
Supply 12V DC And 5V DC N° 6408
Point to point connection (For to remaining leads)
+5V (Term. 1)
Terminal B1
+5V (Terminal) Term. 1 (Plug N°1)
Conser 4 Pts MOLEX
See Pt. N° 20704 To Sync. card
See Pt. N° 20706 Option Security pack
SERIAL LINK
RX (E3) - White lead
RTS (E7) - Brown lead
TX (E2) - Yellow lead
CTS (E8) - Red lead
GND (E5) - Green lead
J1 : Connector supply to RMUC card
J2 : Connector link between RMUC card RFPP card
J3 : Connector for LCD display
J4 : Connector for keyboard
J5 : Connector for CAN BUS link
J6 : Connector for RS232 link
J7 : Connector for debugger
J8 : Connector for commands zones 1 to 8
J9 : Connector for commands zones 9 to 16
J10 : Connector for commands zones 17 to 24
SW2 : Address for CPU card in CAN BUS communication
J11 : Connector for external 2nd setpoint
J12 : Connector for low and high deviation
J13 : Connector for network information
J14 : Connector for intensity measurement
J15 : Connector for CAN BUS link
J16 : Connector for supply of LDC display

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2.6 SAFETY CONDITIONS

M Series cabinets are fitted with:

- circuit breaker for tool protection.

- electronic circuit for monitoring of voltage for device protection against faulty and overvoltage (10% of extra power is admissible).

- Venting, filter (must be cleaned frequently to prevent damage).

Each power control card 16A or 5A is protected by:

- The power control card is protected if supply voltage exceeds 275 V.

- Quick blown fuses on all phases and neutral protect the TRIAC against overcurrent draw.

2.7 THERMOCOUPLES

Temperature sensors are connected on the male HARTING plug (in case of a non-mixed wiring diagram) located on backside of cabinet. Thermocouples of J type (Iron-Constantan), or K (Ni.Cr/NiAL), or auxiliary inputs can be connected. Conform to polarity diagram as indicated on the wiring diagram.

Some standards define colours for thermocouple leads, for instance:

J sensors (+ = Iron, - = Constantan):

- French standard:
Iron: Yellow / Constantan: Black

- German standard:
Iron: Red/ Constantan: Blue

- British standard:
Iron : Yellow / Constantan: Blue

- European standard:
Iron: Black / Constantan: White

- American standard:
Iron: White / Constantan: Red

''+'' is Iron and can easily be identified with a magnet.

K sensors (+ = Chrome or Nickel-Chrome, - = Alumel or Nickel-Aluminium):

- French standard :
Chromel: Yellow / Alumel: Blue

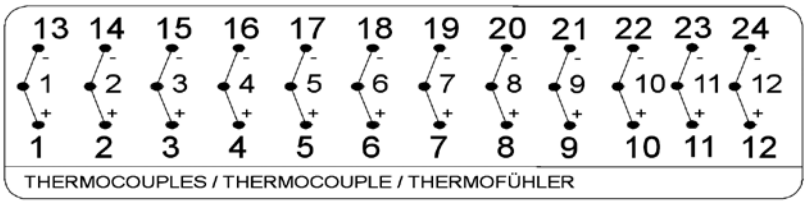
- German standard:
Chromel: Red / Alumel: Green

- British standard:
Chromel: Red/ Alumel: Blue

- European standard:
Chromel: Green / Alumel: White

- American standard:
Chromel: Yellow/ Alumel: Red

Wires between J or K thermocouples and connectors on backside of cabinet must made of the same metal as the sensor (compensation leads) in order not to introduce parasite thermocouples.
Wiring diagram according to INCOE standard:



BASE FOR THERMOCOUPLE 48 pins 16A
Type HARTING HAN E WITH MALE INSERT.

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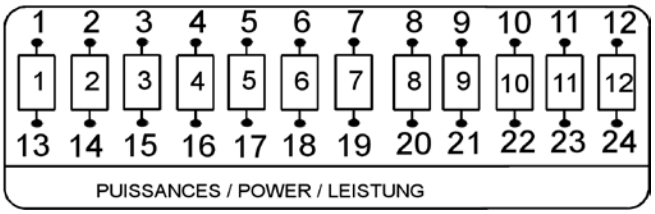
2.8 POWER OUTPUT

For 16A and 5A power control cards, heaters are connected to a female HARTING HAN E 24 pins 16A connector.

Wiring diagram according to INCOE standard:



BASE POWER 48 pins 16A
Type HARTING HAN E WITH FEMALE INSERT.

Each zone Nbr. (or control card) must match with the same number for thermocouple and heating element.

INCOE® cables for thermocouples and power have specific features to prevent wrong orientation of plug / receptacle inserts.

2.9 ALARMS AND SETPOINT SWITCHES

It is possible to remotely switch from service setpoint to standby setpoint and vice-versa over a switch connected between pins 1 and 4 of the connector 2nd SETPOINT AND ALARMS.

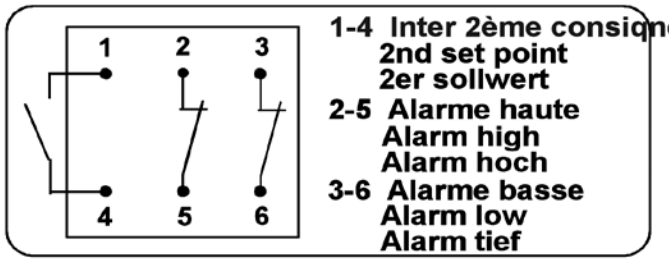
Contact closed = 2nd setpoint.

Contact open = 1st setpoint.

It is possible to activate a sound or visual alarm (buzzer, flashlight…) from the same connector.

- for deviation high: switch between pins 5 and 2.

- for deviation low: switch between pins 6 and 3.



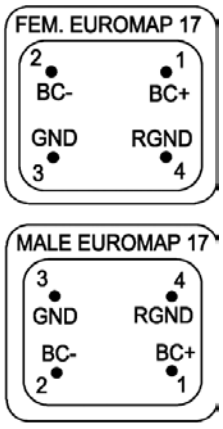
A sticker is affixed on the upper cover of the cabinet (version 4U) or on backside of cabinet (version 9U and superior):

2.10 COMMUNICATION ACCORDING TO EUROMAP 17 PROTOCOL

4 pins connectors male and female located on backside of cabinet enable the connection of an M Series cabinet to an injection molding machine or with a computer for data exchange according to the EUROMAP 17 protocol.

CAUTION:

Respect polarity on wires BC+ et BC-.



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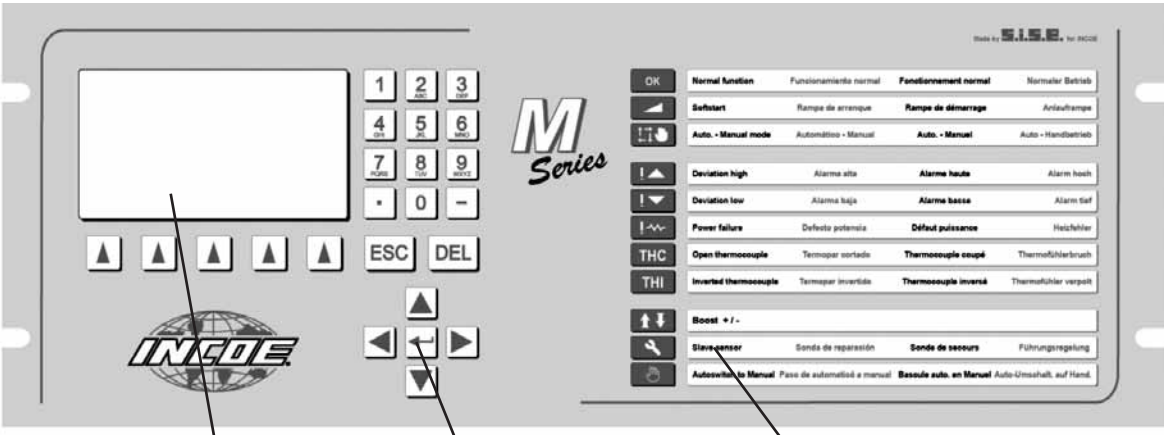
2.11 OPERATOR INTERFACE



LCD Display

Direction arrows and Enter key

Explanation of program icons

These keys are for accessing functions as defined on the LCD screen.

Enter key and key for zone selection. Keep it pressed for 2 seconds for selecting all zones or a group of zones.
In case zone groups have been defined, press this key to apply a new function to all zones in this group.

Escape key.

Key to delete an input completely or partially.

Alphanumeric keyboard for inputs.

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2.12 START UP

Connect power supply cable to an appropriate power supply (See sticker on the backside).

Check thoroughly the wiring going to and from the cabinet.

Switch on the cabinet with the circuit breaker on backside.

After 10 seconds, the following page is displayed:

M Series Hot-Runner Control Please wait ...
Serial No:40429A / 03150006 /Version No:V02.09.04
Set Alim RTHI OK. Ident OK : CPU no 0
Synchro OK : [CPU0:16Z]
Load OK
Serial No. of cabinet
Serial No. of CPU board
Program release No. inside CPU

Then a second intermediate page is displayed:

Cabinet 4U 16 zones 16A
M Series
1740 E.maple Road Troy, MICHIGAN 48083 U.S.A
Tel : 248-616-0220 Fax : 248-616-0229
Email : info@incoe.com Web : www.incoe.com
Cabinet type

After this introduction sequence, you may visualize 3 main pages with successive pushes on the NEXT key.

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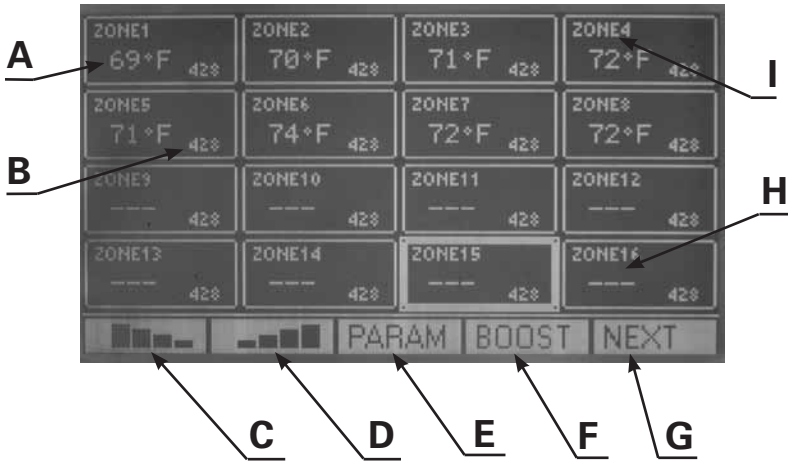
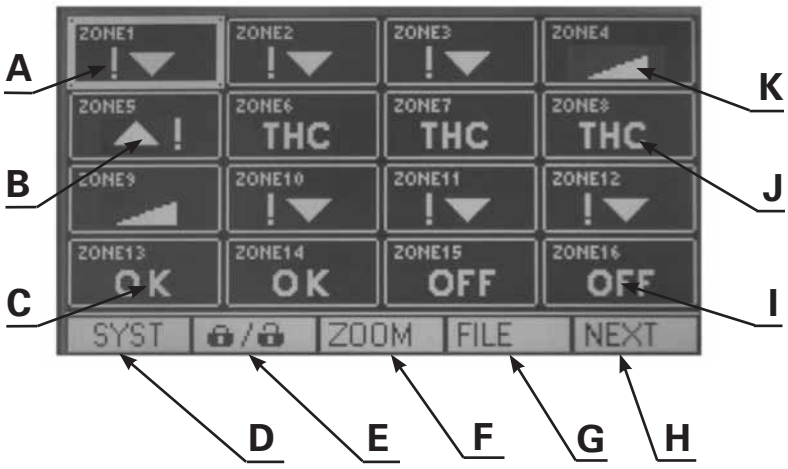
2.13 TEMPERATURE PAGE



A: Actual temperature value in °C or °F.
B: Setpoint in °C or °F.
C: Decrease setpoint value.
D: Increase setpoint value.
E: To access the page for configuring control parameters.
F: To access page for parameters of control zones.
G: To access next page (Status page and Mode page)
H: Means that no reading of actual value is possible:
THI (thermocouple reversed) or
THC (thermocouple broken)
I: Zone label (configurable). Name of the zone

2.14 STATUS PAGE



A: Zone with deviation low.
B: Zone with deviation high.
C: Zone in normal function.
D: To access the page for system parameters.
E: To lock or unlock the keyboard with a password. (Please note that when a PC running WIN'COM 2000 is connected, the cabinet keyboard is deactivated).
F: Select display mode:
Zoom 1 zone among 16.
Zoom 2 zones among 16.
Zoom 4 zones among 16.
G: To access the page for file management
H: To access next page (Mode page).
I: Zone switched off.
J: Thermocouple broken (or reversed).
K: Zone in soft start.

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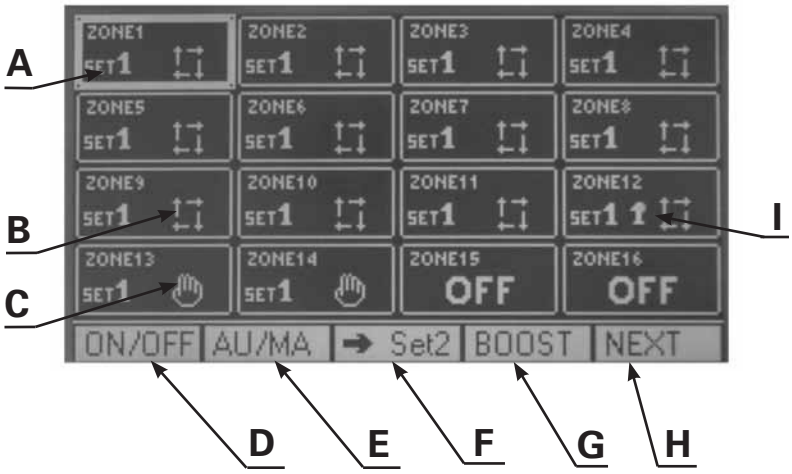
2.15 MODE PAGE



A: 1st setpoint.
B: Control zone in automatic mode.
C: Control zone in manual mode.
D: To switch a zone on or off.
E: To switch a zone from automatic to manual mode.
F: To switch from 1st setpoint to 2nd setpoint.
G: To activate the BOOST function.
H: To access next page (Temperature page).
I: Indicates the zone is in BOOST mode.

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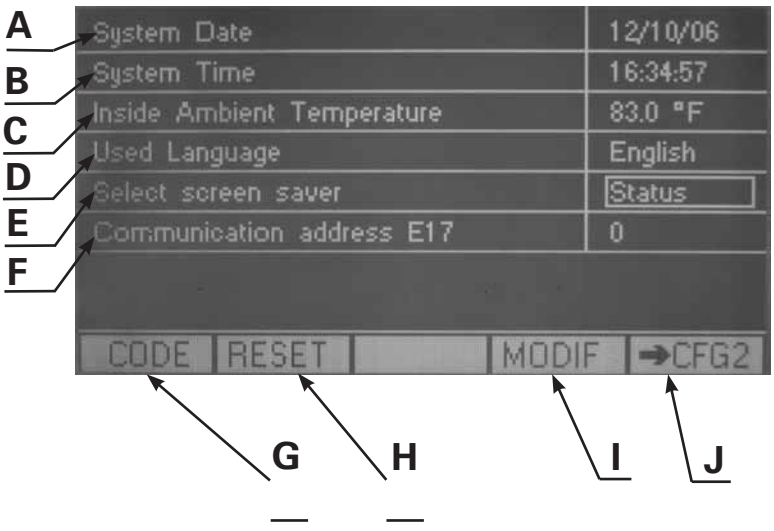
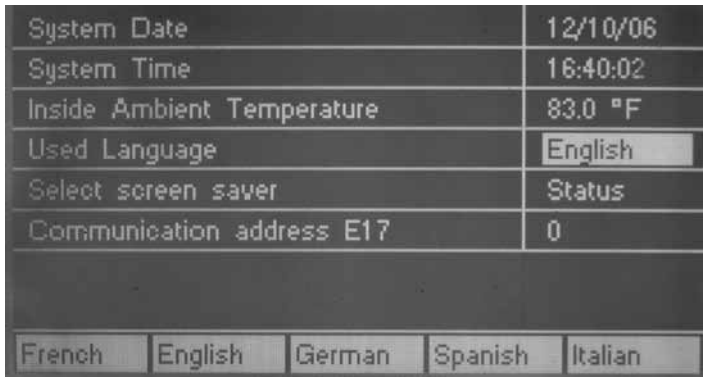
2.16 EXPLANATION OF THE VARIOUS DISPLAY PAGES

(From the mode page)

Press CONFIG to access the following page:





A: To modify system date (with the alphanumeric keyboard).

B: To modify system time (with the alphanumeric keyboard).

C: To read ambient temperature inside cabinet via a sensor on CPU card.

D: To modify language. You may select among 5 languages : French, English, German, Italian and Spanish (see screen below).

E: To select the screen displayed permanently and automatically after the keyboard has not been touched for one minute.

F: To enter address of the cabinet for Euromap 17 communication between WIN'COM 2000 software and the control cabinet.

G: To change password for locking and unlocking access to the system. Important notice: factory setting is 123456.

H: To restore all cabinet and zone settings as they were at delivery.

I: To modify parameters in this page.

J: To move to page configuration 2 (CFG2).

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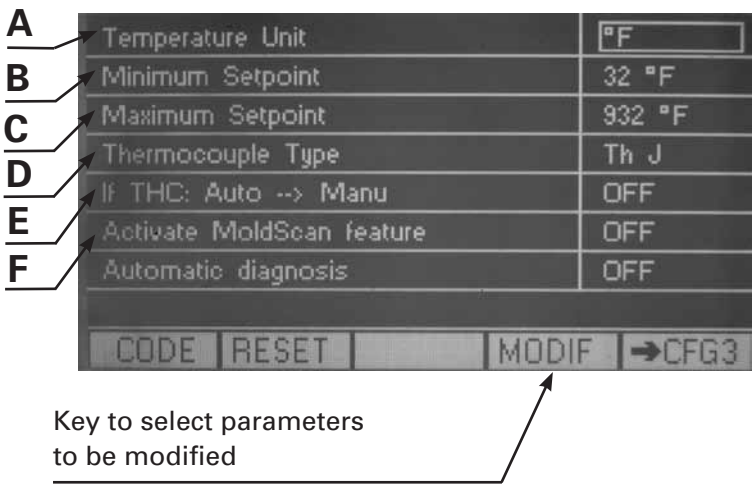
Press CGF2 to access the following page:



A: To select the temperature unit (°C or °F).

B: To define a minimum setpoint.

C: To define a maximum setpoint.

D: To select a type of sensor (type J or type K).

E: To allow the automatic switch to manual mode in case of thermocouple breakage. If so, the last percentage of power calculated by the CPU is applied to the zones with broken sensors. If not, the power is cut and the zone remains in automatic mode. Press NEXT to access the second page for configuration:

F: To enter the password to activate the MoldScan option.

A: To select the softstart mode: either ramp duration (RT) or ramp rate (RR).

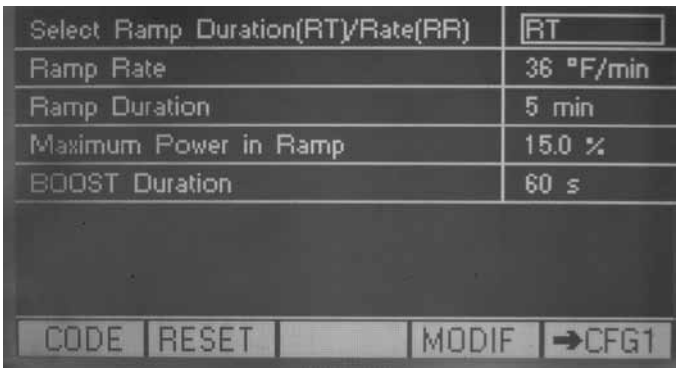
B: To select ramp duration with unit °F/minute (if selected before).The temperature is raised every minute by a preset number of degrees. The percentage of power applied is not limited. When actual temperature reaches setpoint, the ramp is over. Its duration depends on the gap between setpoint and actual temperature value as well as the temperature increase per minute selected.

C: To define the ramp duration in minutes (if this mode was selected).

D: To define the maximum power applied during the softstart phase (in %).

E: To define the duration of the BOOST function (in seconds).The principle of the BOOST function is to increase or decrease setpoint of all zones during a programmable period of time.

Press CGF3 to access the following page:



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2.17 CONFIGURATION OF CONTROL PARAMETERS

Keys to scroll in parameters in both directions

2.18 PARAMETERS OF CONTROL ZONES

Still from the temperature page, press the PARAM key to access the following page:

From this page, you may select several parameters by pressing the key:

- **Active setpoint**
- **1st setpoint AUTO (°F)**
- **2nd setpoint AUTO (°F)**
- **1st setpoint MANU (%)**
- **2nd setpoint MANU (%)**

- **BOOST value (°F)**: this is the value in °F by which the setpoint will be increased or decreased on one or more selected zones during a programmable period of time. Adjustable from 0 to 500°C (or °C).

- **Deviation high (°F):** Adjustment of acceptable deviation above setpoint. Adjustable from 0 to 500°C (or °C).

- **Deviation low (°F):** Adjustment of acceptable deviation below setpoint. Adjustable from 0 to 500°C (or °C).

- **Zone number and description:** for naming zones.

- **Zones regrouping:** to gather several zones into a group. You may group by manifolds or nozzles and manage group 1 and group 2 eventually for other zones.

- **Zone slaving:** in case of broken or faulty thermocouple, you may use the temperature value from another neighboring zone for control. This prevents an immediate action on the tool. Select the faulty zone when the parameter "zone slaving" is shown. Press MODIF and select with the direction arrows the required zone for troubleshooting.

- **Power applied (%):** to display instant power value applied to each heating element.

- **Other parameters:** after entering password (factory setting 123456) to display and/or modify other control parameters such as control mode (PID or manual), gain .....etc. (Should only be accessed by INCOE personnel or maintenance dept when necessary).

To modify above mentioned parameters, simply press the MODIF key.

Then a window for **parameter modification** is displayed:

Notice: to change setpoint, select one or more zones and press any key on the alphanumeric keyboard, a window then opens for setpoint modification (see screen below). Type in new setpoint value and enter.

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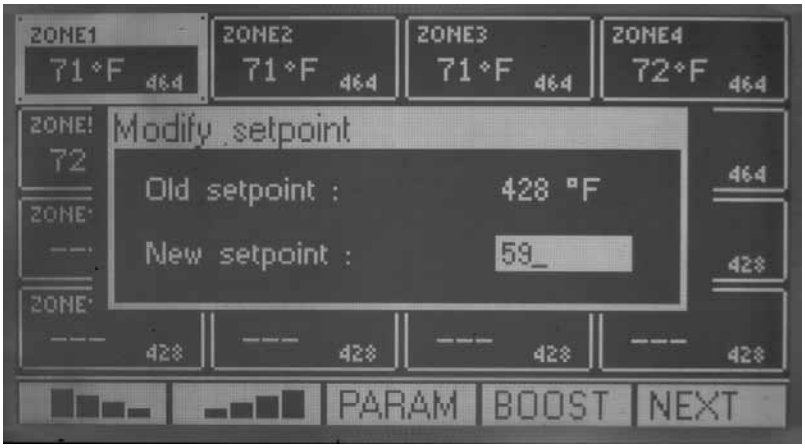
Example : Label of zone 1.

Zone 1 is selected : it is displayed with white background

Window for parameter modification



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2.19 LOCKING KEYBOARD

Still in the status page, press to access the following page:

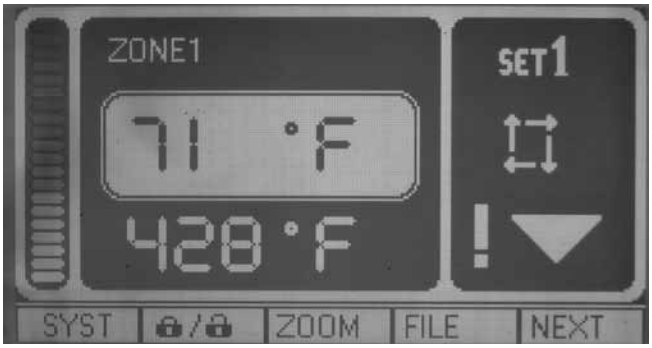
Access to the parameters can be locked by using the password.

The factory setting is 123456.

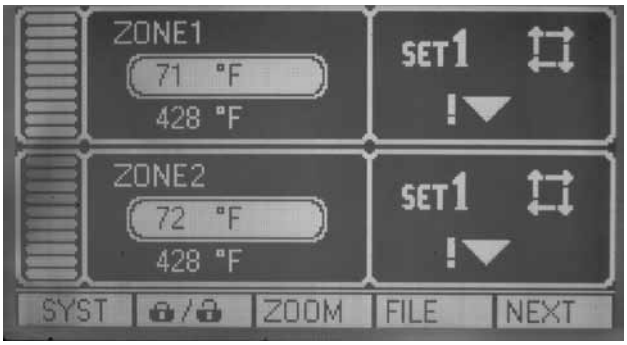
2.20 ZOOMING ON ZONES

Pressing the ZOOM key enables the selection to the zoom level on display. You may display 1 zone, 2 zones or 4 zones on the screen:

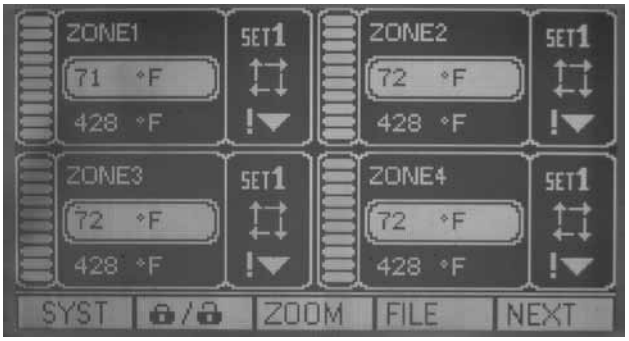
To change this password, please see **page 18, part G.**



Display mode 1 zone on screen



Display mode 2 zones on screen



Display mode 4 zones on screen

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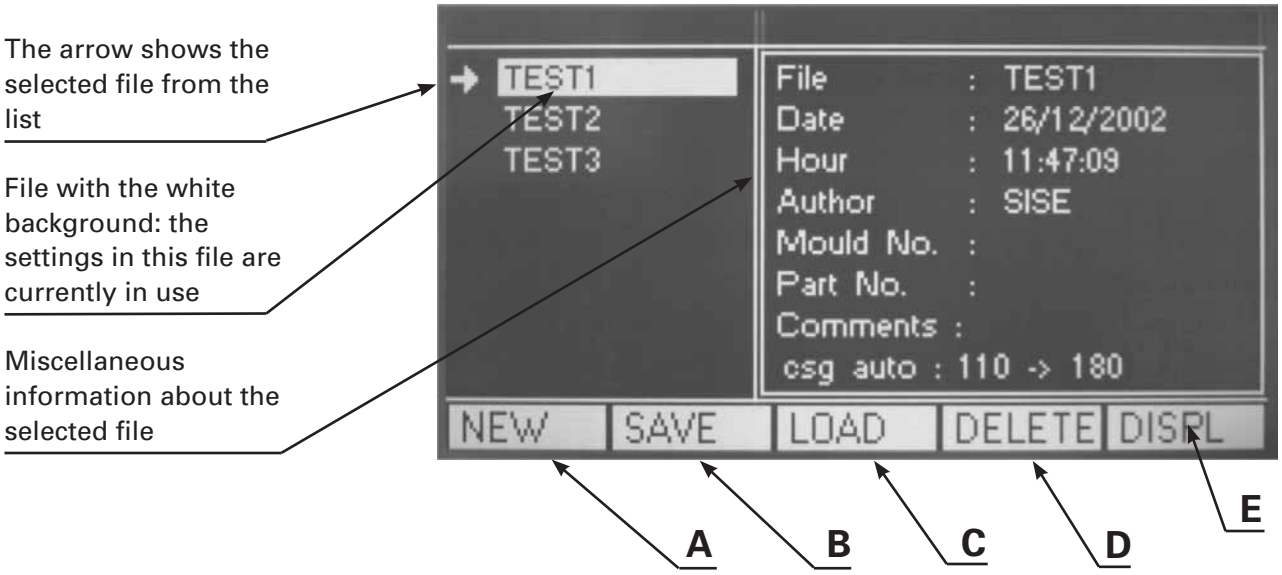
2.21 FILE MANAGEMENT

From the status page, press the FILE key to access the page for file management:



This page is for file management. Each file may contain the author, mold and part number as well as free comments.

A: To create a new file.

B: To save new parameters under the current file name.

C: To load selected file.

D: To cancel selected file.

E: To display main file parameters before loading.

Notice: the cabinet memory has a maximum capacity for **16 files.**

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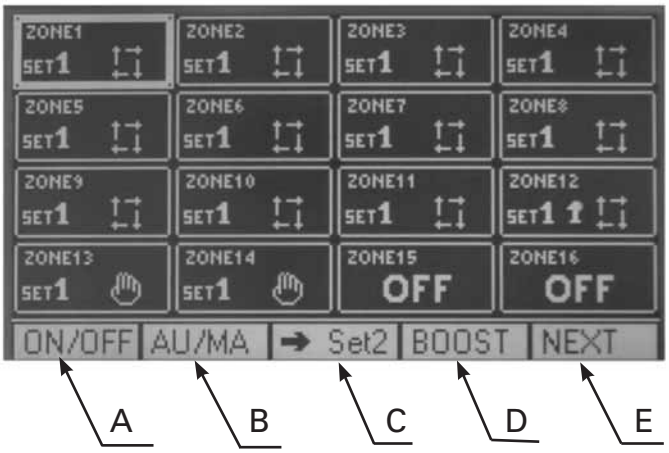
2.22 MODIFICATION OF ZONE STATUS

A: To switch on and off one or more zones.
A message OFF is displayed when switched off.

B: To switch from automatic to manual mode and vice-versa.

C: To switch from 2nd setpoint to 1st setpoint and vice-versa.

D: To activate the BOOST function to be configured in the PARAM page. The BOOST function is stopped after a predefined time or by pushing the BOOST key a second time. (see page 23 part E and part 13.2).



2.23 ALARM MANAGEMENT

As soon as an alarm is activated on one or more zones (for instance deviation low, deviation high or others…..), the screen below is displayed after one minute without touching any key:

Important notice : this icon means there is no power to the heater and that an alarm is currently activated.

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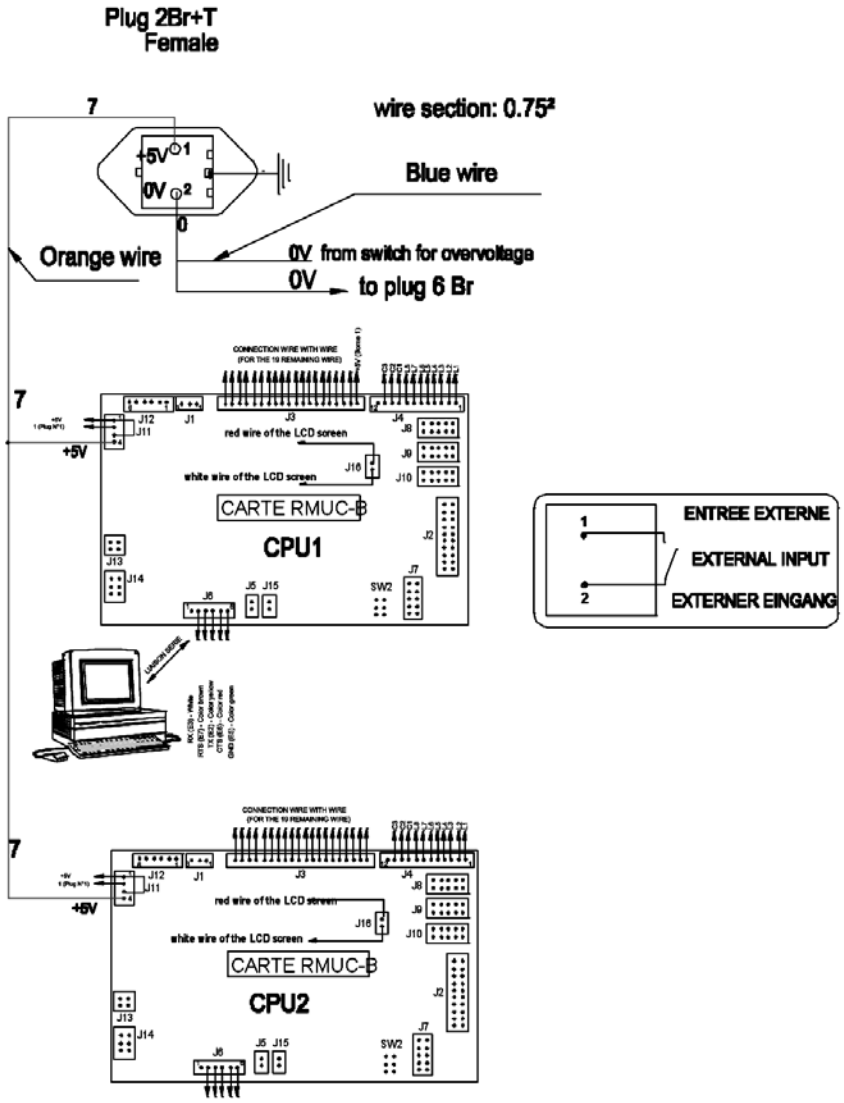
2.24 MOLDSCAN OPTION



2.25 CONNECTING DIAGRAM

The aim of this option is to analyze the electric heaters inside the tool by measuring the current zone by zone in order to define:

- installed electrical power (in Watts).

- resistance value of the heating element (in Ohms).

- the temperature increase (in Degrees/Minute).

It shows all alarms (thermocouple broken or reversed, open load ...) in a dated logbook. It also shows in real time a diagram about the temperature changes and the setpoint for a selected zone.

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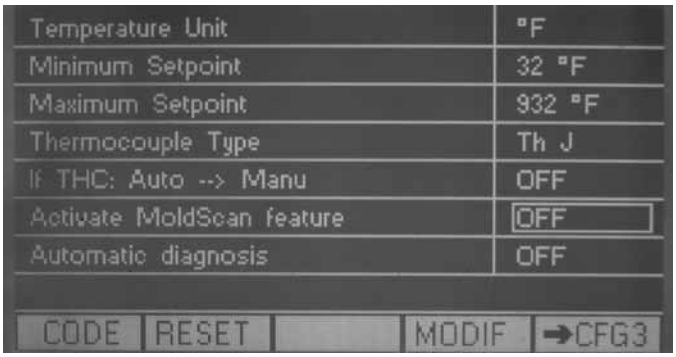
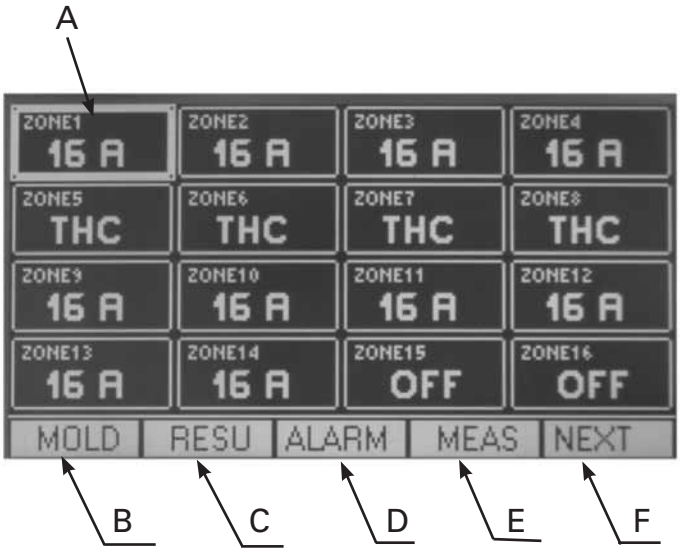
2.26 ACTIVATION OF MOLDSCAN

Turn to on the line "Activate MoldScan option" with the left and right arrows, then validate; this is done from the System page (CFG1) or in the MODIF menu.



Line "Automatic Analysis ": when this feature is selected, a diagnostic on the zone(s) in automatic mode and currently under temperature low or high alarms is performed. A new Scan is carried out on these zones until the alarm disappears. When not selected, the Analysis can be started manually with the Scan menu.

A fourth main page is displayed when the line "Active MoldScan function " is ON:



A: shows the type of control zone (16A cards or 5A cards). Depends on the configuration of the cabinet.

B: to manually start the Scan of the tool.

C: to display all parameters for the mold Analysis.

Parameters displayed:

- Amps for each control zone.
- Power (in Watts) for each control zone.
- Resistance (in ohms) of each heating element.
- Response time (in °/min) for each control zone

D: to show all alarms recorded in logbook.

E: to display actual temperature for each control zone and their setpoint in a graphical form.

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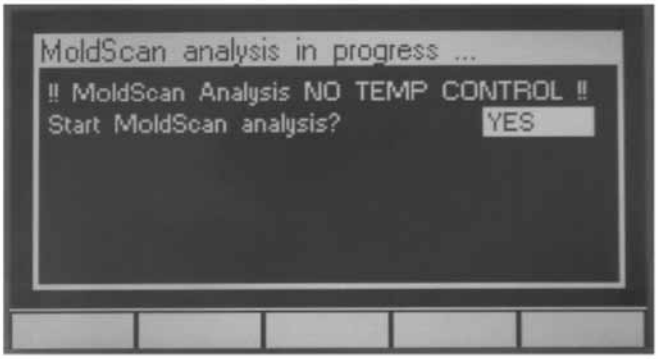
2.27 START MOLD ANALYSIS

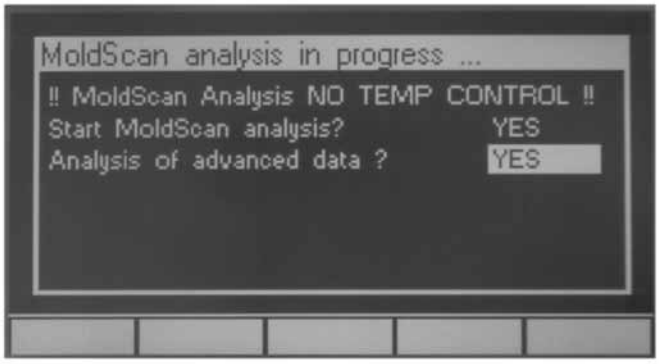
The following page is displayed when pressing the SCAN menu:



With the direction arrows, select YES and enter to start a MoldScan Analysis.

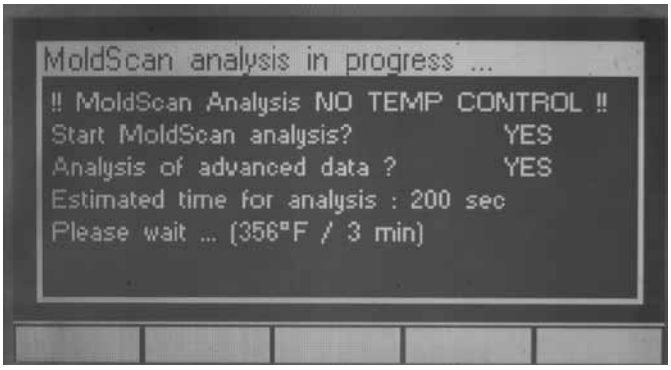
By pressing NO, the MoldScan diagnostic will not be carried out.

The following page is displayed when you select YES and enter:


MoldScan analysis in progress ...
!! MoldScan Analysis NO TEMP CONTROL !!
Start MoldScan analysis? YES
Analysis of advanced data ? YES

Select YES for "Advanced Data Analysis" and validate.

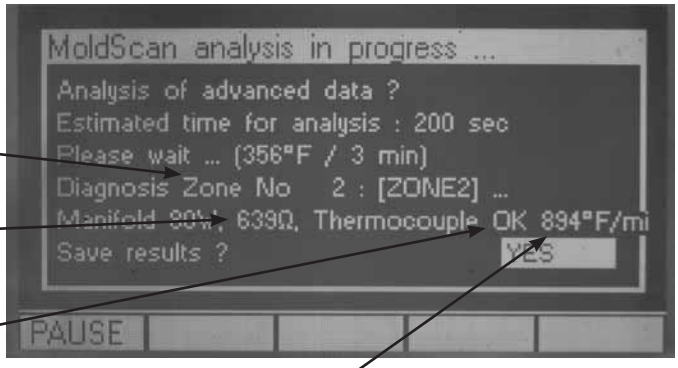
This starts a detailed Analysis of control zones and to define all parameters described in 14.2. If you select NO, a shorter Analysis will be carried out. All parameters described in 14.2 except the response time (in degree /minute).


MoldScan analysis in progress ...
!! MoldScan Analysis NO TEMP CONTROL !!
Start MoldScan analysis? YES
Analysis of advanced data ? YES
Estimated time for analysis : 200 sec
Please wait ... (356°F / 3 min)

The info page below is shown to confirm the start of the Analysis:

The Analysis (advanced or not) lasts for a certain time (depending on the number of zones inside the cabinet).

During Analysis, data is displayed in real time in page shown below:


MoldScan analysis in progress ...
Analysis of advanced data ?
Estimated time for analysis : 200 sec
Please wait ... (356°F / 3 min)
Diagnosis Zone No 2 : [ZONE2] ...
639Ω, Thermocouple OK 894°F/mi
Save results ? YES
PAUSE

Zone wattage

Zone resistance

Thermocouple status

Temp. response time

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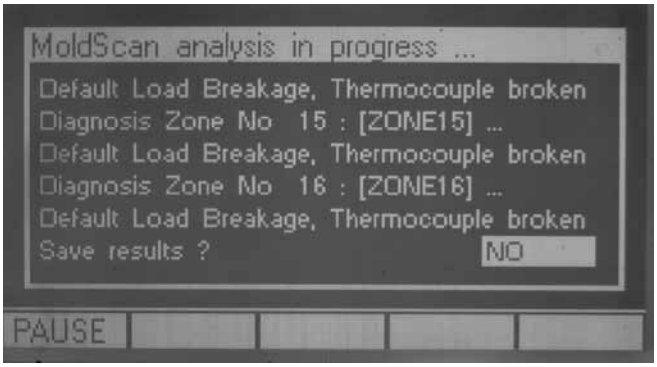
The following page is displayed when the diagnostic is over: A message asking if saving is required is shown.

Tip: It is recommended to save values of the Analysis by selecting YES with the left and right arrows, then enter.


MoldScan analysis in progress ...
Default Load Breakage, Thermocouple broken
Diagnosis Zone No 15 : [ZONE15] ...
Default Load Breakage, Thermocouple broken
Diagnosis Zone No 16 : [ZONE16] ...
Default Load Breakage, Thermocouple broken
Save results ?
NO
PAUSE

Notice: the Analysis is carried out on all zones if no specific zone is selected. Otherwise, the Analysis is carried out only on the selected zones.

The status of each zone is shown on the main page when the Analysis is over.

The icon shown above is displayed in case of :

- Blown fuse.
- Wrong load (heater) connections.
- Triac short circuit.
- Current value measures is different from the saved value during Analysis.

2.28 DISPLAY RESULTS

Press MEAS to display results when the Analysis of the control zones is over.

The page below is displayed:

The first parameter displayed is the reference current value saved during the Scan process.

Select other parameters with the keys and such as current measurement (in Amps), applied power (in Watts) etc....

Notice : When in the page for current measurement, press menu DIAG to carry out a new measurement on one or more zones selected previously (see page below).

DIAG enables current measurement independently on one or more zones.

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2.29 POWER PERCENTAGE MONITORING

This function allows to obtain an alarm signal when the percentage of power sent to the heaters in the mold is considered as out of the normal values.

You have to give the system a reference value on each zone. This value is a percentage of power in reference to the average percentage of power on the zone.

The average value is refreshed every second so that an alarm could be declared every second.
A too large variation of the percentage of power can show an abnormal situation on the controlled zone.

Here is an example about how this monitoring system works:

The Average power (PCA) is calculated in real-time and refreshed every second on each zone.

Example: PCA = 45,3% on zone 1. (this value given by the CPU changes every second)

The user defines a Reference value (PCR) on this zone.

Example: PCR = 46% on zone 1. (this value is fixed)

The user defines a Monitoring tolerance (PCS) on this zone.

Example: PCS = 2% on zone 1 (this value is fixed)

Each time the Average power (PCA) goes higher or lower than the Reference value (PCR) + or – the Monitoring tolerance (PCS), an alarm is declared:

Monitoring alarm when PCA > PCR + PCS

To reset the appearing alarm, here are the possibilities:

- If the Average power (PCA) decreases by itself and comes back into the correct values (between PCR-PCS and PCR+PCS). The alarm disappears by itself.

- If you set the Monitoring tolerance to 0 (PCS = 0).

- If you switch off the system, you reset the alarms. Be careful the average value is not memorized (PCA).

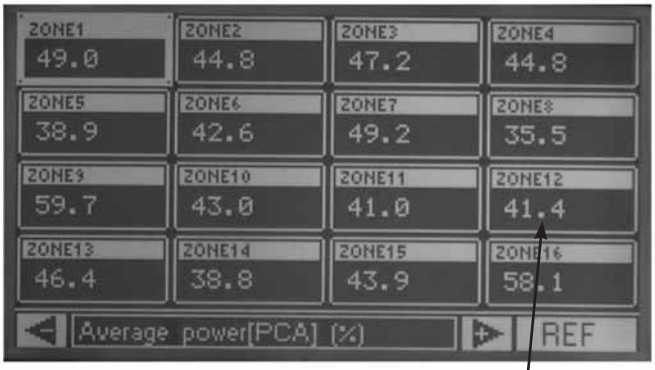
- If you change the setpoint value so that the system is not in a normal control mode (heat up or not).

Note: This system can be switch off by setting the monitoring tolerance to 0 (PCS = 0).

By selecting the RESU menu you can display several parameters from this function.

Use the and function keys to select the right parameter.

You can for example display the Average power (PCA) calculated in real-time:



Average power (PCA) calculated in real-time

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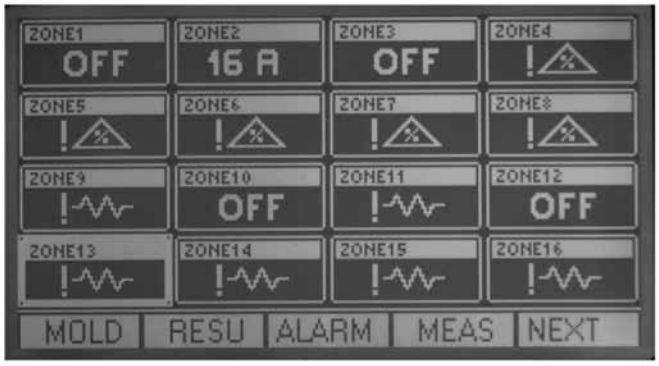
By selecting REF, you can memorize the actual Average power output values (PCA) as Reference values (PCR), as shown below:

Reference power (PCR) (defined by the user)

Then, you have to set a monitoring tolerance value (PCS)

Monitoring tolerance between 0 and 100%. If this value is 0, the monitoring is switched off.

In the main screen of the MOLDSCAN feature, when an alarm on the percent output shows up, an icon as shown on zone 4 will be displayed:



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2.30 DISPLAY ALARMS

Press the ALARM key to display all alarms as shown below:

N°
11 12/11 14:15:37 Default Load Breakage
12 12/11 14:15:37 Default Load Breakage
13 12/11 14:15:37 Default Load Breakage
14 12/11 14:15:37 Default Load Breakage
3 12/11 14:16:37 Alarm Low
1 12/11 14:17:19 Alarm High
2 12/11 14:17:19 Alarm High
BEGIN
N° / 🕘
DELETE

A: to move to the oldest or to the latest alarm message 500 messages are stored. Alarm 501 erases alarm 1 automatically, and so on.

B: to sort alarm messages by zone number or date and time.

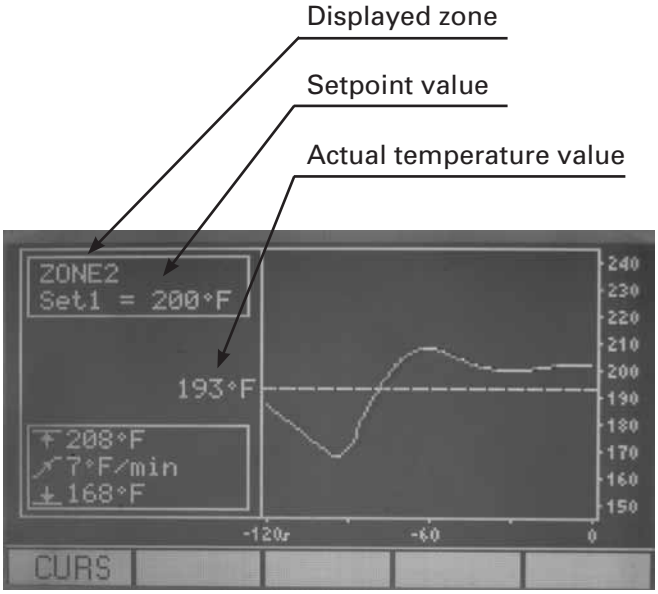
C: to delete one or more preselected alarm messages.

Notice: Alarm messages are sorted by zone number or date and time.

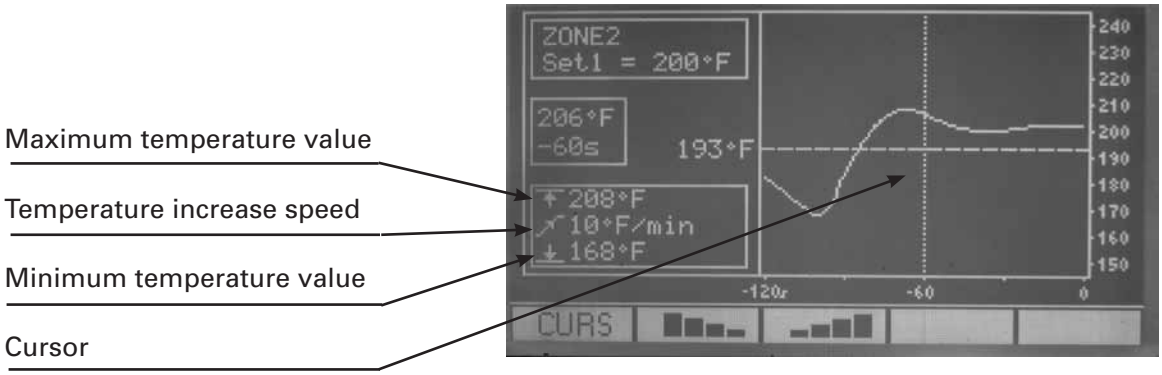
2.31 DISPLAY CURVES

Press menu MEAS to display actual temperature and setpoint as a matter of time.

As shown below:



Press menu CURS to position a vertical cursor as shown below:



Press left and right arrows on the keypad to display another control zone.

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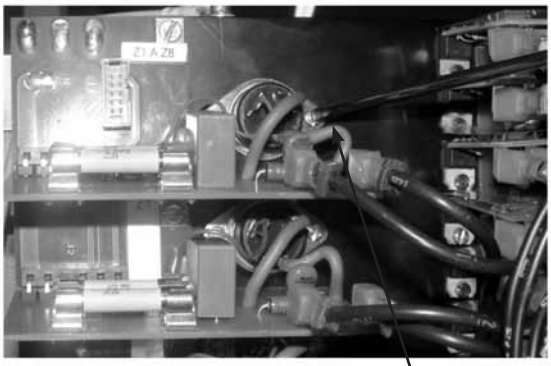
2.32 REMOVE AND REPLACE A 16A CONTROL CARD

1) Remove back cover and unscrew the 2 screws holding the TRIAC BTA40A/700B.

Then you may pull the control card in your direction in order to remove it from the black 6 pins connector.

DO NOT REMOVE CARD IF TRIAC HAS NOT BEEN UNSCREWED.

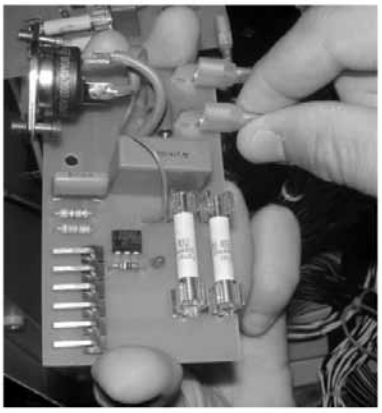
1)



Screw driver

2) Hold control card in hand and remove the 2 connectors as shown. Place new card and replace with.

2)



2.33 REMOVE AND REPLACE A 5A CONTROL CARD

1) Remove back cover and unscrew the 2 screws holding the TRIAC BTA12A/700B.

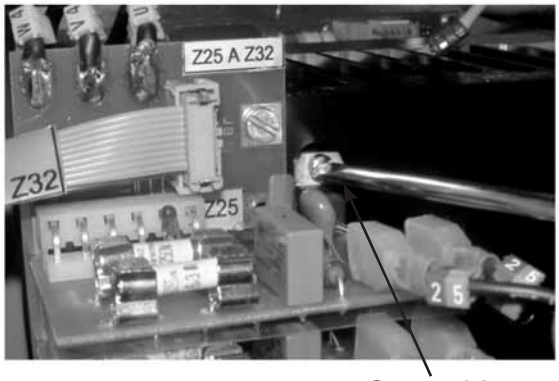
Then you may pull the control card in your direction in order to remove it from the black 6 pins connector.

DO NOT REMOVE CARD IF TRIAC HAS NOT BEEN UNSCREWED.

2) Hold control card in hand and remove the 2 connectors as shown.

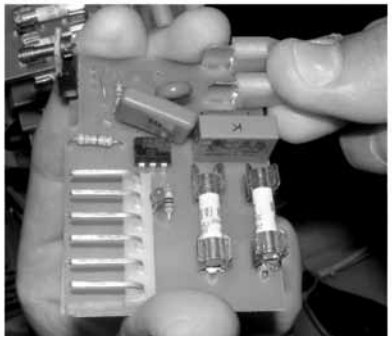
Place new card and replace with.

1)



Screw driver

2)



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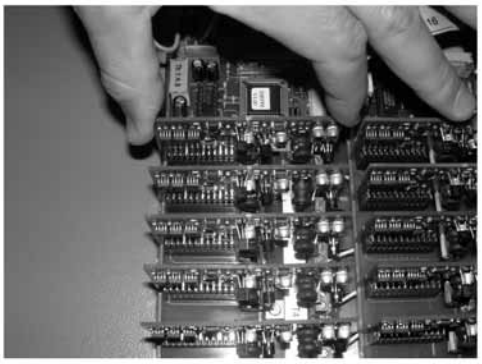
2.34 REMOVE AND REPLACE A THERMOCOUPLE INPUT CARD

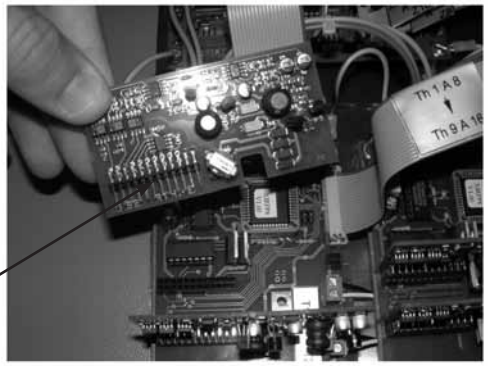
1) Cabinet is switched off, remove front plate to access the faulty card. Without using any tool pull the card upwards to remove it from the 20 pins and 6 pins Black connectors.

1)



2) Replace with new card make sure that gold plated contacts are well located inside the 4 pins and 20 pins Black connectors.

2)



NOTE: CHECK THAT ALL CONTACTS ARE SECURE

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2.35 LIST OF SPARE PARTS

INCOE item	Description	Quantity
5034	16A Control card	2
4779	5A Control card	2
5095	Thermocouple input card	2
649	Fuse 16A type GRB (10 x 38 mm)	4
4472	Fuse 5FA 6.3A (5 x 20 mm)	4
5400	Fuse 5FA 2A (5 x 20 mm)	2
909	Triac BTA40A / 700B	2
5730	Triac BTA12A / 700B	2
3075	Display LCD 240 x 128 pixels	1
6438	Supply 230V / 12V-5V 40W (only in cabinet 4U)	1
6447	Supply 230V / 12V-5V 110W (from cabinet 9U)	1
6828	Ventilator 230VAC (120 x 120 x25 mm) (only in cabinet 4U)	1
2894	Ventilator 230VAC (120 x 120 x 38 mm) (From cabinet 9U)	1

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3.1 TABLE OF POSSIBLE FAULTS

Fault	Effects / tool	Display	Safeguards	Solutions
Thermocouple broken	Decreasing temperature.	THC THC with alarm sign displayed on screen.	- Alarm for deviation low activated. - Command of TRIAC is cut and there is no power to the heater	-Repair break after testing thermocouple with ohm-meter. - Switch to manual mode if repair is too long or if you did not activate sensor slaving for operating with the sensor of another similar zone (see p21 confirm). - The icon is displayed to confirm that another sensor is used.
Thermocouple pinched	Overheating	Temperature is constant but lower than required setpoint. The deviation being low, the following icon is displayed: with alarm sign displayed on screen.	-Alarm for deviation low activated.	- Repair pinched T/C - Switch to manual mode if repair is too long or if you did not activate sensor slaving for operating with the sensor of another similar zone (see p21 confirm). - The icon is displayed to confirm that another sensor is used.
Thermocouple reversed	Decreasing temperature.	THI THI with alarm sign displayed on screen..	- Alarm for deviation low activated.	- Revert polarity
Heater open	Decreasing temperature.	The Symbol appear on screen on relevant zone and alarm sign displayed on screen	- Alarm for deviation low activated.	- Check connections. - Replace heater.
Heater partly open	Decreasing temperature.	Displayed actual temperature drops Power indication different from the one normally expected.	- Alarm for deviation low activated. - Percentage of output power increases.	- Check connections. - Replace heater
Heater shorted to ground	Decreasing temperature.	Corresponding power control card is cut on faulty zone. Symbol is displayed on screen with a blinking alarm sign. Power applied is increasing.	- Deviation low or high is activated. - Fuse GRB 16A for 16A control cards or fuse FA 6,3A for 5A control cards is blown.	- Too high moisture : dry out heater and replace if necessary. - Cabinet is switched on, remove upper cover and check faulty fuses with LED indicators. Cabinet is switched off, replace fuses where the indicator was lit. **Replace with same type of fuse.**

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Fault	Effects / tool	Display	Safeguards	Solutions
Temperature variation.	Actual temperature is unstable.	Display of actual temperature is unstable, symbols or ! ▼ layed ! ▲	- Deviation low and high are activated.	- Problem with material to hot or to cold. - Problem with mold.
Short circuit in heater	Temperature is decreasing.	The corresponding zone has alarm for low deviation. The following symbol is displayed: and an alarm is displayed. The ! ▼ percentage of power applied is increasing.	- Deviation low is activated. - Fuse GRB 16A for 16A control cards or fuse FA 6,3A for 5A control cards is blown	- Too high moisture : dry out heater and replace if necessary. - Cabinet is switched on, remove upper cover and check faulty fuses with LED indicators. Cabinet is switched off, replace fuses where the indicator was lit. **Replace with same type of fuse.**
Triac shorted	Overheating on zone	Actual temperature is increasing drastically. The following symbol is displayed : the alarm page is disp ! ▲ he percentage of power applied is increasing.	-Deviation high is activated.	**Switch off cabinet immediately** Send control card for repair to INCOE or replace faulty control card.
- Fuse GRB 16A for 16A control cards or fuse FA 6,3A for 5A control cards is blown	Actual temperature is decreasing.	The corresponding zone is shown as fault on cabinet screen.	- Deviation high is activated.	- Cabinet is switched on, remove upper cover and check faulty fuses with LED indicators. Cabinet is switched off, replace fuses where the indicator remains lit. **Replace with same type of fuse.**
The zone heats continuously	Temperature is increasing.	Actual temperature on corresponding zone is increasing steadily. The symbol is displa ! ▲ the alarm sign is displayed after one minute.	- Deviation high is activated.	- Check power value in PARAM page. - Check all connections as well as heating cartridge.
The control card does not work when switching the cabinet on.	The corresponding heater does not heat up	No actual temperature value is read. The zone shows "---" instead of actual temperature value.	- Deviation low is activated.	- Make sure that the control card is plugged in. - Check thermocouple input card by swapping card with a working zone. - Check cabinet fuses.
Main switch trips when switched on	No heater is heating inside the mold	The screen does not light.	- Cabinet switched off.	- Check supply voltage. - Check if neutral is connected if supply is 400V 3 ph that require a neutral. - Check total current draw to the mold.

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PROCEDURE FOR MOLD SETTERS

Example of trouble: a control zone does not reach setpoint value.

Locate faulty zone.

Go to temperature page.

Press on menu **PARAM**.

Scroll in parameters with the + key until « applied power (%)» is shown.

Or press menu **ZOOM** and select the faulty zone on the wide display.

Check if the bar graph shows maximum power.

If the applied power shown equals 100% and the zone does not heat up, 3 reasons should be investigated:

- The heating element is over dimensioned in comparison to the power the INCOE control card can deliver and the fuses will blow at any time. (Maximum current 16A or 5A depending on card type).

- The power card has two fuses (one on phase, and the second on neutral). One or both are maybe faulty

- A wire between the control card and the tool is not connected or miswired.

The resistance may also be faulty.

For any other conditions, any service to the inside an M Series cabinet should be carried out by authorized personnel.

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PROCEDURE FOR MAINTENANCE PERSONNEL

Example of trouble : a control zone does not reach setpoint value.

Read **page 16** to locate the faulty zone.

Then switch off the M Series cabinet with the main circuit breaker.

Unscrew top cover and backplate (from 9U versions).

Locate faulty control card for that zone. 2 indicators of blown fuse are fitted on this card below each fuse.

Switch on the cabinet again.

If one or two indicators light are ON, change the corresponding fuse(s).

CAUTION: replace with the same type of fuse, i.e. quick-blow fuses type GRB 16A (10x38mm) or type FA 5A (5x20mm) depending on card.

If no indicator lights, **then switch off the M Series cabinet with the main circuit breaker.**

Check fuses with a testing device (Ohm-meter). Switch on the cabinet when the fuses are OK.

Check with a testing device if 230V AC (Volt/Ohm-Meter) is actually available on the control card output (blue or red connectors depending on card type). Caution ! before checking, make sure the zone setpoint is 100% in manual mode and that all other zones are switched OFF.

If 230V AC is available, the failure is not caused by the control card.

Switch off the cabinet again with the circuit breaker.

Check electrical continuity (Ohm-Meter) between the connectors on the control card, HARTING connectors on backside of the cabinet and to the mold.

- Remove the holding bar and move the control card upwards to remove both 20 pins and 4 pins black connectors.

- Re-mount the holding bar.

IMPORTANT NOTICE: when in function, during the soft start phase and depending on the percentage of power used by each control card, current value on neutral may be higher than one of the three phase.

This overcurrent is controlled by the main circuit breaker on backside of cabinet.

The current consumed depends on the nominal power of the heaters and the number of control cards utilized.

Also:

- Any work to be done inside cabinet should be carried out by authorized personnel.

- Any component must be replaced by parts with same specifications.

- Any work done inside the cabinet must be carried out after complete stop procedure (except if only to check faulty fuses thanks to LED indicators).

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4.1 GENERAL TERMS & CONDITIONS OF SALE

1 Applicable Law and Jurisdiction

These general terms and conditions apply to all proposals and quotations submitted by Seller, to all purchase orders received by Seller, and to all goods and services sold by Seller, except as other-wise specifically provided in a document signed by Seller. This sale or any sale resulting herefrom consists only of these terms and conditions and those in other documents which are referred to herein or are attached hereto or in a document subsequently signed by Seller and referencing this transaction (all of which constitute the "Agreement"). THE AGREEMENT SHALL BE GOVERNED, CONSTRUED AND ENFORCED UNDER THE LAW OF THE STATE OF MICHIGAN INCLUDING THE UNIFORM COMMERCIAL CODE IN FORCE ON THE INITIAL DATE OF THE AGREEMENT ("UCC"), EXCEPT AS PROVIDED HEREIN. The U.N. Convention on the International Sales of Goods shall not apply. Any services to be provided hereunder, whether or not they are otherwise ancillary to and part of a sale of goods (as separate units), shall be considered ancillary to a sale of goods and the UCC shall apply to all goods and services to be provided hereunder ("Goods"). **THE COURTS OF MICHIGAN SHALL HAVE EXCLUSIVE JURISDICTION OVER THE PARTIES AND THE CLAIMS ARISING UNDER OR RELATED TO THE AGREEMENT.** The parties stipulate to the convenience of Michigan courts in general, and Oakland Circuit Court in particular, as to all litigation. Any declaration of unenforceability of a provision shall be as narrow as possible and shall not affect the enforceability of the other provisions.

2 Formation, Integration and Modification

A. The Agreement supersedes all previous quotations and agreements pertaining to the Goods. Delivery to Seller of the Buyer's acceptance of a Seller's quotation (according to its terms), Seller's actions in reliance on Buyer's oral acceptance of a written or oral quotation, or Buyer's receipt of the Goods, will constitute a binding contract under the terms of the Agreement. The Agreement is subject to Seller's revocation or cancellation without liability until it is approved by Seller at its home office. Notice of such approval may be furnished to the Buyer in the form of an acknowledgment, shipment, or other form of express approval.

B. An order submitted by Buyer orally or in a purchase order or other writing (whether or not it contains terms or conditions modifying, adding to, repugnant to, or inconsistent with these Terms and Conditions), may be accepted, approved or filled by Seller, but any resulting contract and the liabilities or obligations of Seller shall be determined solely by the Agreement, and (unless the Seller otherwise advises Buyer in writing) notice is hereby given that Seller objects to any such terms or conditions in Buyer's purchase order or other writing. Seller shall not be deemed to have in any way enlarged or modified its liabilities or obligations under the Agreement by filling such order or by failing to further object to Buyer's terms or conditions.

C. The Agreement is a final, complete and exclusive statement of the Agreement of the parties. THE SELLER IS WILLING TO NEGOTIATE WRITTEN CHANGES TO THESE TERMS AND CONDITIONS, BUT RESERVES THE RIGHT TO MAKE AN ADJUSTMENT IN THE PRICE OF THE GOODS. No modifications, limitations, waivers or discharge of the Agreement or any of its terms shall bind Seller unless in writing and signed by Seller's authorized employee at its home office. Notwithstanding anything to the contrary in this Agreement, no modifications, limitation, waiver or discharge of any provision of the Agreement shall affect the Buyer's liabilities to Seller accrued prior thereto. Seller may correct unilaterally any mathematical and typographical errors in the Agreement. Typed provisions of the Agreement take precedence over printed provisions. A course of performance, course of dealing, or customs in the trade shall not constitute a modification or waiver by Seller of any right by Seller.

D. The Agreement is only for the benefit of the parties, except all disclaimers and limitations applicable to Seller shall be for the benefit of Seller's agents, employees, contractors, and suppliers. If any provisions are determined to apply to third parties, all other provisions including limitations, waivers, and disclaimers shall also apply.

3 Prices, Payment and Risk of Loss

A. Prices contained in Seller's published price lists, if any, are subject to change without notice. Prices contained in individual written quotations or proposals are firm only for a period of thirty (30) days from the date of the quotation after which Buyer should inquire of Seller as to their validity and request a written confirmation or revision. Prices do not include taxes and Buyer shall pay all applicable sales or other taxes levied with respect to Goods (and replacements) and the Agreement, unless exempt therefrom. All prices are in United States dollars. Buyer shall pay all government fees levied on the installation and inspection of the Goods. Buyer shall pay upon receipt all invoices rendered by Seller for any such items Seller may pay and for the Goods.

B. This Agreement is for a shipment contract and the Goods shall be delivered F.O.B. Seller's dock. Whether or not Seller prepays shipping charges, risk of loss passes to Buyer upon tender of the Goods to a carrier. Seller's breach of the Agreement shall not affect the passing of the risk of loss to Buyer notwithstanding any provision of law to the contrary.

C. Seller may unilaterally increase prices to cover increased costs (plus reasonable overhead and profit) of design, materials, and manufacturing required by changes requested by Buyer after the date of any quotation.

D. All amounts not paid to Seller when due shall incur a carrying charge of 1.5% per month to the extent allowed by law and otherwise at the highest written contract rate allowed by law.

E. All amounts due on installation or other event which requires the action or cooperation of Buyer which Buyer fails to supply timely shall become due upon such failure.

4 Delivery

Shipping dates are estimates based on Seller's present engineering and manufacturing capacity and scheduling, and may be revised by Seller upon receipt or scheduling of Buyer's order. All shipping dates are approximate and shall be computed from the date of entry of the order on Seller's books. All shipping dates are further subject to Seller's prompt receipt from Buyer of a written purchase order or acceptance, letter of credit, down payment, and other conditions as specified in the Agreement, and of all drawings, information and approvals necessary to provide Goods and to grant any credit proposed in the Agreement.

5 Delay of Shipment or Performance Excused for Various Reasons

A. If shipment of any item or other performance by Seller is delayed at the request of or due to the fault of Buyer, Seller may at its option hold the item at the place of manufacture at the risk and expense of the Buyer from the time it is ready for shipment. In the event of any such delay in shipment, full and final payment for an item shall be due and payable thirty (30) days after the Buyer is notified that the item is ready for shipment. If the Seller is unwilling to accommodate the Buyer by holding such item, the Buyer shall accept shipment immediately.

B. Dates for Seller's performance are estimates only. In addition, the Seller shall not be in default because of its delay or failure to deliver or perform resulting, in whole or in part, from: (i) any foreign or domestic embargoes, seizures, acts of God, insurrections, war, or the adoption or enactment of any law, ordinance, regulation, ruling or order, or (ii) the lack of usual means or transportation, fires, floods, explosions, strikes or any other accidents, contingencies, or events, at the Seller's or its supplier's plant or elsewhere (whether or not beyond the Seller's control) which directly or indirectly interfere with, or render substantially more burdensome, Seller's production, delivery, or performance.

6 Inspection, Testing and Rejection

A. If the Agreement expressly provides for Buyer's inspection and/or acceptance of the Goods, Seller's standard test procedures conducted by Seller's representative shall be the criteria for inspection and/or acceptance, unless other specific procedures have been specified in the Agreement.

B. All drawings, specifications, technical documentation, samples, prototypes and Goods shall be deemed approved and/or accepted by Buyer if Buyer does not provide a written objection and/or rejection within seven (7) days of receipt or other reasonable time established by Seller. Any objection and/or rejection by the Buyer must be in writing and state with specificity all defects and non-conformities upon which Buyer will rely to support its rejection. ALL DEFECTS AND NON-CONFORMITIES WHICH ARE NOT SO SPECIFIED ARE WAIVED.

7 Installation and Start Up

All Goods shall be assembled and installed by and at the expense of the Buyer. Seller may furnish, upon request and without additional cost or liability to Seller, written instructions for installing, maintaining, and operating the Goods. At Buyer's request and cost, Seller may furnish personnel and equipment to assist in the installation and/or start up of the Goods. Buyer shall pay Seller its prevailing per diem rates for such personnel and equipment plus reasonable transportation, food, lodging and other travel expenses. Buyer shall have competent supervisory, maintenance and operating personnel present when Seller's personnel are performing such services.

8 Software License

The Seller grants the Buyer, for its internal use only, a non-exclusive perpetual license ("License") of all user manuals, software programs, firmware, and storage media ("Software") provided by the Seller in conjunction with the Goods with which the Software is provided, for the sole purpose of the operation of the Goods. This License terminates automatically if Buyer is in default of its obligations. The Software may be provided in machine readable object code only. Licensee may make and keep one copy of the object code, if provided by Seller, for backup purposes. When making a copy, the Buyer shall reproduce all Seller's copyright or patent notices in all forms originally included in the Software. Buyer shall not make any effort to obtain or reproduce the Software's source code. Title and all ownership rights to the Software remain with Seller, its licensors, or its suppliers. The Software is the proprietary information and trade secret of the Seller or its licensors, whether or not any portion thereof is or may be validly copyrighted or patented. The License may not be assigned nor transferred by Buyer except as a part of a transfer of the Goods with-out the written consent of Seller which may be withheld. The Software is provided for the Buyer's internal use only and the Buyer shall maintain the confidential nature of the Software and related materials and protect them against disclosure or improper use. Buyer shall pay all taxes based on the Software or use of the Software, however designated or levied, except those based on Seller's net income. All disclaimers and limitations applicable to the Goods apply to the License.

9 General Express Warranties

A. Seller warrants to Buyer only, that Goods (or portions thereof manufactured by Seller) shall be free from manufacturing defects in materials and workmanship which are discovered within the warranty period, subject to the disclaimers and limitations of the Agreement. This is not a warranty of performance, but a limited warranty as to the condition of the Goods at the beginning of the warranty period. The warranty period, measured from date of shipment by Seller, shall be: one year for hot runner systems and components (other than heaters and thermocouples); three years for defects causing leakage for DFQ bushings; three years for cast (pro-rated) and DF heaters; one year pro-rated for screen pacs, fast cycle bushings, and KX heaters; six months for thermocouples; two years for temperature and valve gate controllers (reduced to six months for electronic components); one year for quick mold change products; and 90 days for all other Goods. The percentage of the replacement cost shall be reduced by three percent for each full month from 90 days after the date of shipment for the cast heater warranty and by 50% and 75% at the end of six and nine months, respectively, after shipment for the screen pac, fast cycle bushings, and KX heater warranty. Because the Goods may be subject to a wide variety of use, installation, maintenance and cleaning, the warranty is only against such defects and not against any other failures such as, but not limited to, those due to wear and tear, and normal maintenance and perishable items are excluded from this warranty against defects.

B. Seller warrants to Buyer that the Goods will be as described in the Agreement in all material respects, subject to the limitations stated herein and Seller's published and internal standards; however, Seller retains the right to change the dimensions, composition, design, performance, color and appearance of the Goods without liability if, in its judgment, the change is non material. Seller may, in its discretion, also rely on any generally accepted industry standards.

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C. Seller's warranties shall apply only if the Goods: (i) have been installed, maintained, and used in conformity with instructions furnished by Seller from time to time, if any; (ii) have been subjected to normal use for the purpose for which Goods were designed;

(iii) have not been subjected to misuse, negligence, or accident; and, (iv) have not been altered or repaired by persons other than Seller in any respect which, in the judgment of Seller, adversely affects the condition or operation of the Goods.

10 Patent Express Warranties

Seller shall defend and indemnify Buyer from any claim which asserts that the Goods or their inherent methods of operation, intrinsically, infringe any United States patent, except as to a claim based on Buyer's use of the Goods as a step in an overall process or as an element in an overall combination. Seller's obligation shall not apply to a claim based on Goods or portions thereof specified, designed, or manufactured by Buyer. Buyer shall notify Seller promptly of any assertions of patent infringement and provide Seller with assistance and information requested by Seller, or Seller shall have no further obligation to defend or indemnify. Seller shall defend with its counsel or other counsel of its choice and shall have the sole right, without consultation with Buyer, to take all action Seller deems appropriate to prosecute or settle such claims. Seller's exclusive obligation to indemnify as to Goods declared to infringe is limited to the acquisition of a license, the replacement of Goods with non-infringing goods, the modification of the Goods so that they are non-infringing, or the return of the purchase price and shipping costs in exchange for the Goods, as Seller may elect. This section states the Seller's entire and exclusive obligation regarding patent infringement.

11 Disclaimer and Limitation of Express Warranties

There are no express warranties other than those contained in the Agreement. Any representations as to performance and other matters, except as contained in the Agreement, were for illustrative purposes only and do not constitute a warranty. Whether or not the Goods are to be used exclusively by Buyer, there shall be no third party beneficiaries to the express warranties contained herein. Seller does not warrant any portion of the Goods not manufactured by or not furnished by Seller (whether or not specified by Buyer), but Seller shall assign to Buyer upon request all assignable warranties of Seller's suppliers related to such Goods. All descriptions, shipping specifications and illustrations of the Goods or the Seller and its quality and other systems and capabilities in catalogues, brochures and price lists or otherwise provided by the Seller are intended for general guidance only and the Seller is not responsible for any errors or omissions therein or for any loss or damage resulting from reliance on them. Seller does not warrant that it or the Goods are in compliance with any entity, organization or industry standards, guidelines, or procedures unless specifically contained in the Agreement.

12 Remedy and Limitation of Seller's Liability

A. Defective or non-conforming Goods discovered and returned during the warranty period shall be repaired, or replaced by Seller without any additional charge and shipped to Buyer, FOB Seller's plant, for reinstallation by Buyer at its cost, subject to the terms hereof. The warranty obligation of Seller is limited to the repair or replacement at Seller's plant of any part of the Goods which Buyer shall, within the warranty period, return to Seller, with transportation charges prepaid by Buyer, and which Seller shall determine upon examination to be defective or not in conformity with the express warranties contained herein. In lieu of repair or replacement, if Seller elects, Seller may, upon return of such Goods and making a determination of non conformity or defect, keep the Goods and refund the purchase price. Buyer's remedies shall be limited **(even in the event of Seller's default of its warranty obligations)** exclusively to those provided in this section. **UNDER NO CIRCUMSTANCES SHALL SELLER BE LIABLE FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES.** Buyer waives any causes of action or theories of liability including, but not limited to, those arising under contract, tort, strict liability, product liability, statutes, or otherwise, except as specifically provided by the UCC as modified and limited herein. The replacement or repair of Goods by the Seller does not give rise to any new warranty except the warranty period provided for herein shall be extended by the length of any period from the date the defective or non conforming Goods are received by the Seller until the date repaired or replacement Goods are delivered to Buyer.

B. Buyer must contact Seller requesting warranty coverage plus a return authorization number and other instructions for the return of Goods to Seller or other instructions. If requested by Seller, Buyer shall issue a new purchase order or amendment to Seller for replacement parts, subject to Seller issuing a credit memo if Buyer's claim for warranty coverage is approved. Buyer must comply with Seller's return instructions (including return of the Goods) within 30 days or the claim shall be deemed conclusively to have been abandoned. Buyer is responsible for properly tagging, identifying, and packing returned Goods. Goods returned without compliance with the above procedures shall be returned to the sender at sender's cost.

13 Disclaimer of Implied Warranties

THE SELLER DISCLAIMS ALL IMPLIED WARRANTIES (OTHER THAN GOOD TITLE) INCLUDING BUT NOT LIMITED TO THOSE OF FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, AND NON-INFRINGEMENT. Seller does not warrant the Goods will comply with the requirements of any safety or environmental code or regulation of any federal, state, municipality or other jurisdiction beyond the specific express warranties in this Agreement.

14 Parts, Service and Training Performed by Seller

All warranty and non-warranty parts, inspection, labor, service, software, and training, if any, provided by the Seller or its agents and contractors (including those provided under purchase orders subsequent to the Agreement) related to the Goods are subject to all limitations and disclaimers of warranties and remedies provided in the Agreement. The Seller may have access to the Goods during or after installation of the Goods. The Seller is not under any duty to inspect the Goods for any defects or any improper use or modification of the Goods nor to correct or advise the Buyer of any such condition, use or modification, which is observed. Any notification which may be given is voluntary and subject to all limitations and disclaimers in the Agreement.

15 User's Responsibility for Safety

It is Buyer's or other user's responsibility to provide all proper dies, devices, tools, training, and other means that may be necessary to effectively protect all personnel from serious bodily injury which otherwise may result from the method of particular installation, use, operation, or service of the Goods. Manuals furnished by Seller; ANSI Safety Standards; EPA, OSHA and similar state regulations; and other sources should be used by Buyer to insure the safe use of the Goods. If Buyer fails to comply with the obligations set forth in this section, Buyer shall indemnify and save Seller harmless from any liability or obligation incurred by Seller to persons injured directly or indirectly in connection with the operation of the Goods and all warranties of Seller shall become automatically void.

16 Indemnification

Buyer shall indemnify the Seller from any and all third party claims, damages, and expenses (including reasonable attorney fees) under theories of tort, product liability, negligence (ordinary or gross), warranty, contract, statute, or otherwise arising out of the use, storage, sale, processing or other disposition of the Goods, supplies or materials used in connection with the Goods, or parts manufactured with the Goods, if the action or inaction of the Buyer or its employees, customers or agents, or the Buyer's design specifications, were a material or proximate cause of injuries or damages giving rise to claims against the Seller.

17 Consequential, Incidental, and Other Damages

BUYER AND THIRD PARTIES SHALL NOT BE ENTITLED TO ANY CONSEQUENTIAL, PUNITIVE, EXEMPLARY, OR INCIDENTAL DAMAGES, AS DEFINED IN THE UCC OR OTHERWISE. **This limitation shall be enforced regardless of whether Seller has defaulted in its warranty or other obligations.** Any legal inability to limit or restrict the right of the Buyer or a third party to such damages shall not affect the right of Seller to indemnification hereunder, and under no circumstance shall Buyer recover more than the purchase price.

18 Security Interest, Power of Attorney

In addition to any security interest granted by the UCC, the Buyer hereby grants a security interest to the Seller in all Goods and documents related thereto and proceeds and products therefrom to secure all obligations of the Buyer to the Seller, whether or not arising under the Agreement. Buyer shall sign financing statements evidencing the security interest as reasonably requested by Seller, or Seller may file a copy of the Agreement or portion thereof as a financing statement. Buyer grants Seller an irrevocable power of attorney to sign Buyer's name to a financing statement if necessary or convenient to perfect Seller's security interest. In case of a default by Buyer, Seller may peaceably enter the premises of the Buyer and others to repossess or render inoperable all Goods in which it has a security interest.

19 Proprietary Information

A. Buyer acknowledges that any information disclosed to Seller has not and will not be confidential or a trade secret unless clearly and conspicuously noted on the disclosure, or in some other writing delivered to Seller at or prior to the time of the disclosure. Otherwise, Seller shall be under no obligation to refrain from using in its business any information, manufacturing processes or unpatented disclosures which may pass to it from Buyer in the performance of the Agreement

B. All proposals, plans and other information furnished by the Seller in bidding, negotiating and performing the Agreement, are confidential and the property of Seller and shall not be shown or disclosed to any other bidder, and shall not be shown or disclosed to any third party or used by Buyer except as may be necessary for the selection or use of the Goods.

C. Any invention or other information developed by Seller in the performance of the Agreement shall remain the property of Seller.

20 United States Government Regulations

The Buyer shall not engage in any transaction with respect to the Goods which violates any statute or regulation of the United States of America.

21 Certifications

Seller certifies that any Goods produced in the United States shall be produced in compliance with all applicable requirements of Sections 6, 7 and 12 of the U.S. Fair Labor Standards Act, and of the regulations and orders of the U.S. Department of Labor issued under Section 14 thereof. No other certifications or waivers regarding payments to Seller's suppliers or laborers are required.

22 Time for Bringing Action

Any proceeding by the Buyer for breach of the Agreement or any other right against Seller arising from or in connection with the payment cannot be filed nor maintained unless: (i) it is commenced within one (1) year after the cause for action has accrued; (ii) Buyer has given timely written notice to Seller of its claim as provided herein; and (iii) Buyer deposits the unpaid portion of the purchase price with the tribunal pending final adjudication. An action shall accrue no later than shipment of the Goods.

#330439 (2/21/01)

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5.1 GLOBAL SERVICE

In case of problem or for any further information, please use the contact information below, or visit www.incoe.com.

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INCOE® CHINA I SHANGHAI

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PDF copies of this manual are available for download on our website at: www.incoe.com/manuals

5.2 GLOBAL OFFICES

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printed 04/11

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